AMBULANCE SERMONS.

AMBULANCE SERMONS

BEING A SERIES OF

POPULAR ESSAYS ON MEDICAL AND ALLIED SUBJECTS

BY

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Dedicated

BY SPECIAL PERMISSION TO

HIS GRACE THE DUKE OF SUTHERLAND, K.G.,

IN MEMORY OF MANY PLEASANT YEARS SPENT

IN SUTHERLAND AS DISTRICT MEDICAL OFFICER TO

HIS GRACE, AND AS A PERSONAL TRIBUTE TO HIS UNIFORM

KINDNESS AND COURTESY TO HIS TENANTRY, AND

HIS MANY LIBERAL EFFORTS IN

THEIR BEHALF.

PREFACE.

AMBULANCE Classes, now so much in vogue, are an advance towards the diffusion of useful medical knowledge among the people—a worthy object, which until quite recently had been almost entirely ignored.

In the winter of 1884-85, my colleague and partner, Dr Rice Oxley, of Streatham, organized an Ambulance Class in Norwood, which was numerously attended. An important feature of this class was the prominence given to instruction in elementary anatomy and physiology, enabling the pupils to comprehend the principles on which medical treatment is based, and showing the undertaking to have been conceived in the spirit of a true practitioner, opposed to every semblance of quackery. Sir Andrew Clark, who addressed the pupils at the end of the course, complimented them highly on the way they had acquitted themselves at the competitive examination.

Subsequently, the author set his pen going

in the same cause, and a series of papers appeared from week to week in the columns of the *Norwood Review*, under the somewhat anomalous title of "Ambulance Sermons," which are now offered to the public in the form of a volume.

My thanks are due to the editor of the *Norwood Review* for throwing open his columns, in the name of philanthropy, to popular medical literature, and thereby risking the censure of those whom Sir David Brewster would characterize as "the timid and respectable body who dread innovation, and the scientific tyrants that threaten them with the penalties of knowledge."

I am also indebted to my friend Mr Josiah Temple for invaluable assistance in the work of publication; also to Canon Carver, Mr W. Hodgson, Mr R. Fogg, and Mr F. North, for their kind interest in the work.

West Norwood Lodge,
West Norwood, S.E.

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CHAPTER XXXI.

AMBULANCE SERMONS.

CHAPTER I.

HOW TO TREAT A COLD ON PHYSIOLOGICAL PRINCIPLES.

IF we analyze the life of this corporate body of ours, we shall find that it consists of a series of vital processes or functions, such as motion, alimentation, respiration, circulation, innervation, secretion, and excretion. They are distinct operations, though dependent on one another for their individual well-being, and that of the body to which they minister. There is nothing mysterious about these functions because they are vital, being conducted and governed by familiar forces and recognised laws. The purifying of the blood, for example, is a simple instance of combustion, the oxygen inhaled by the lungs seizing the molecular particles of used-up tissue, and burning them, evolving heat, carbonic acid, and water as the products of combustion. Digestion is a plain chemical process that may be imitated faithfully

in the laboratory by the aid of pepsin, hydrochloric acid, and heat. Absorption of nourishment by the blood from the stomach and intestines is conducted in obedience to a law of chemical physics called osmosis, and may be illustrated by an animal membrane stretched between two fluids of different densities. Excretion by the skin and kidneys is nothing more mysterious or complicated than the simple process of filtering. When we come to the functions of the nerves and nerve centres, though we know well how they behave under varying conditions, and though we have a vague idea that they are allied to the phenomena of electricity, we cannot find their true counterpart in the inorganic world, and consequently cannot readily explain them. When we come to the all-mysterious *will*, the fountain-head and origin of every voluntary act, the *primum mobile* of volitional power, we are fairly beyond our depth. We know enough, however, of our fearful and wonderful structure and its mechanism, to enable us to appreciate the ordinary ailments of life, and relieve them by rational modes of treatment.

How Catarrh is produced.—The morbid condition, familiarly known as "a cold," and technically called *catarrh*, is an illustration of the mutual dependence of the various functions on one another. We have little idea of the length-

ening chain of disturbances clinging to the most ordinary ailments of life. Like the undulations of air when sound vibrates through space, or like the ever widening circle of ripples when a stone is dropped into water, the slightest disturbance of molecular arrangement in the economy by disease, affects even remote parts by the contiguity of close mutual dependence and sympathy. When we catch cold, it is through the medium of the nervous system that we become affected. The great producer of catarrh is cold ; not absolute, but relative cold. The estimation of cold varies in each individual case, and at different times in the same case, according to two important conditions. The first is the degree of temperature to which any particular body has habituated itself. For instance, a person who has lived much in tropical climates will estimate cold differently from one who has spent all his life in Northern regions. This may be illustrated in another way. Take three basins. Fill the first with very hot water, the second with tepid water, and the last with ice-cold water. Dip your hand in the first basin for a moment, then transfer it suddenly to basin No. 2, containing tepid water, and the latter will feel cold by contrast. But if the hand be kept awhile in the ice-cold water and then transferred to the tepid water, the latter will feel warm.

The second condition is the state of the nervous system at the time. Even natives of cold climates, if they feel depressed, or fatigued, or out of sorts, are apt to feel the cold more acutely at such times. We shall treat more particularly of relative cold and nervous conditions, when we discuss the preventive treatment.

The action of cold on the skin causes an impression on the nervous system, which is conveyed to the cutaneous arteries, causing them to contract, checking the supply of blood to the skin, and consequently diminishing evaporation through the sweat glands. When we take into consideration that the skin is one of the great eliminators of the body—that is, a medium through which waste matter is thrown out of the body—we can readily understand the gravity of having its functions impaired, whereby deleterious substances are retained in the blood. Surgeons are familiar with the fact that in burns, the danger of a fatal issue is not in proportion to the depth of the injury so much as the extent of the skin involved. If the burn is extensive, it means that a large area of eliminating surface is hopelessly destroyed, and that a proportionate amount of morbific material is thus retained in the blood. Unable to leave the body by its natural outlet, the noxious matters expend themselves through the intestines, setting up fatal diarrhœa. Hence diar

rhœa setting in some days after an extensive burn, is a symptom of the worst omen. Why the excretion should invariably select the mucous membrane of the intestines under such circumstances, is one of the things we cannot explain. Again, when during convalescence from scarlet fever, the epidermis or outer skin is peeling off, the tender denuded underlying structure is very apt to be affected by cold and have its functions suddenly checked. When this happens, the cutaneous excretion does not expend itself through the intestines, as in the case of burns, but through the kidneys. The burden is in this instance thrown on them, and inflammation of the kidneys and dropsy follow in consequence. Hence the great necessity of specially guarding against cold after scarlet fever. Amongst the poor people, whose children run about barefooted as soon as they leave their beds after a scarlet fever attack, it is very common to find swelled limbs and bodies, with pallid puffed-up features, like so many little old men and women in the last stages of Bright's disease. Why the intestines are chosen in the one instance and the kidneys in the other, as the collateral channels of cutaneous excretion, I cannot explain. When the functions of the skin are partially checked by the action of the cold, the regions that most usually suffer in consequence

are the mucous membrane of the nose, throat, and other parts of the respiratory tract, which become more or less inflamed, relieving themselves by a discharge of mucus. Here again we cannot explain the elective principle which selects this region for the defluxion. Catarrhs, however, are not confined to the respiratory passages, but may attack any organ affording an outlet, such as the stomach, kidneys, lungs, and bladder.

Treatment of Catarrh.—Now having before us the combination of circumstances producing a cold, let us indicate briefly the principles of treatment ; only principles can be given. Hard and fast prescriptions can only be given with the particulars of each individual case before us ; but principles are applicable to every case. The quack sits, so to speak, on a particular branch of treatment. The true practitioner, on the other hand, commands the trunk — the principle—whence issue all the branches.

The first thing to be done is, to afford suitable protection to the skin against cold, by warm clothing, avoidance of undue exposure, and, above all, sudden changes of temperature. Gentle exercise should be taken, but fatigue depresses the system, and must be avoided. The second indication is to try and restore the functions of the skin and relieve the congested mucous membrane, by warm baths, warm drinks,

and medicines, such as Dover's powder, which promote perspiration. The addition of alcoholic stimulants to warm drinks is a mistake, as stimulants are contra-indicated in acute febrile conditions. The third indication is to soothe the inflamed mucous membrane, by some simple emollient, such as glycerine jujubes, the glycerine and gum being admirably adapted for lubricating the parts which otherwise would be dry and harsh.

It is only in the early stages that a cold can be *cured*. If the discharge of mucus be once fairly established, it is idle to attempt to *cure*. The cold must then be left to expend itself, a process which occupies more or less time, according to the peculiarity of the patient's constitution and other circumstances, the treatment being confined to protecting the skin, and treating symptoms as they arise. Cough mixtures are useful remedies, when chosen with discretion, to suit the peculiarities of each case ; but aggravating and distressing compounds when chosen haphazard and recklessly by the ignorant. Sedatives, expectorants, and demulcents have their respective uses, which should be duly recognised in connection with the nature of the cough to be allayed, and there is no such thing as a mixture or preparation to cure all coughs, except in the flaming advertisements of quacks and speculative chemists.

When the throat feels dry, hot, and irritable, when the head aches, when vague sensations of creepiness, lassitude, and thirst tell you that you are "going in" for a cold, as it is commonly phrased, then is your moment for active treatment. But if you delay until the catarrh is established, and you are partially recovering from the premonitory symptoms above referred to, then you have lost your chance of *curing* the cold, in the sense of cutting short its course.

The preventive treatment of colds is a more important and pertinent matter, and will form the subject of the following chapter.

CHAPTER II.

ON THE PREVENTIVE TREATMENT OF COLDS.

IN common with birds and a large class of the animal kingdom known as mammals—*i.e.*, animals whose females suckle their young—man is called a warm-blooded animal. By the term "warm-blooded animal" we mean one that possesses within certain limits the peculiar capacity of maintaining a uniformly high temperature in its body, independent of that of the air or other medium by which it is surrounded. For instance, whether a man is exposed to severe cold in winter, or to excessive heat in summer; whether he lies immersed in a bath of cold or hot water, the temperature of his blood remains the same. It never varies, or only does so within very narrow limits. This is a remarkable fact, as, apart altogether from external influences, the constant supply of heat to the blood by the oxidation of disintegrated tissue, and certain elements of food which have not been converted into tissue, which goes on during every moment of our lives, must alone tend to raise its temperature. It does not do so, how-

ever, and the explanation of this phenomenon of animal heat, on which so much of our subject hinges, I shall presently explain.

Cold-blooded animals, on the other hand, are those whose habitual temperature is low and inconstant, varying with the changes in the temperature of the surrounding medium. Fishes, amphibia, and reptiles belong to this class, as well as the myriads of beings in the lower forms of life, with the exception of two sub-kingdoms which have no proper blood system, and can hardly be spoken of as *cold-blooded.*

Animal Heat.—The warmth of our bodies is mainly derived from the union of inspired oxygen with the carbon and hydrogen of waste tissue, a chemical process essentially the same as that of the burning of coals, and, like the latter, evolving heat during its combustion. There is no stationary condition in living tissue. Decay and renewal are the essence of life. The primordial cells of which the various parts of the body are built up are constantly dying, and new ones drawn from the blood are as regularly taking their place. Every act of inspiration, every beat of the heart, every word we utter, every sigh we breathe, is an expenditure of structural matter. The *débris* composed of dead and unused structures is swept away by the blood currents, from which it is removed by

oxidation, the heat evolved being utilized, and the other products of combustion, carbonic acid and water being expelled by the lungs.

The income of animal heat being chiefly derived from the combustion of used-up tissue, we can easily understand that the supply, though constant, must needs be very irregular. On taking exercise, for instance, there must be increased waste of tissue, and consequently more heat evolved, which, as we know by experience, is actually the case. In the case of hybernating animals, on the other hand, the degeneration of tissue and the evolution of heat must be reduced to its minimum. And yet, the mean temperature under these extreme conditions is practically the same, viz., 98·5° F., or thereabout. The regulation of animal heat is one of the most interesting phenomena in physiology.

The superfluous heat is disposed of by conduction and radiation in the capillaries of the skin, and by evaporation through the sweat glands and air passages. Hence, after severe exertion, we find our breathing accelerated and the skin moist and warm. In some animals, such as dogs, in whom the skin does not act with the same freedom as in man, the bulk of the exhalation takes place through the lungs, causing them to pant. Thus the balance is maintained. These functions, again, are under

the immediate control of the nervous system. Cold acts on the latter in such a way, that the vessels supplying the skin are constricted, and the flow of blood to the surface checked, loss of heat by conduction, radiation, and evaporation being thus prevented; while heat, on the other hand, relaxes the blood vessels and favours the escape of heat from the body.

By means of this exquisite self-regulating apparatus, therefore, and the artificial aids of fires and warm clothing, we are enabled, amid the varying conditions of our body, and the capricious operation of external influences, to maintain a pretty uniform animal heat. But, in spite of all, irregularities will sometimes occur; and the most lenient penalty we are made to pay for failure or violation is a cold in the head.

Generally speaking, the human constitution is a forbearing mechanism, and will long and patiently endure the abuses to which the frailties, follies, and vices of man often subject it, before it resents. It will even connive at his errors by brave efforts to repair or make compensation for the mischief they have wrought. In heart disease, for instance, when the valves of that organ are diseased and the pumping of the blood embarrassed, the muscular walls acquire increased thickness and power to enable them to overcome the difficulty. When a joint is dislocated, and no attempt made to reduce the dis-

location, the head of the bone in process of time sets about making a joint for itself in its new situation, making the best of the misfortune and accommodating itself to its new surroundings. The intemperate man's liver and kidneys do not usually succumb in a year or two to the toxic effects of alcohol, but long years of patient protest precede the final breaking up. Bullets lodged within the body often become enclosed in a fibrous case, which compassionate Nature patiently weaves round them, and they cease to give trouble. If a particle of foreign matter enter the nose, windpipe, or stomach, does Nature complacently permit the intruder to remain and set up injurious if not fatal inflammation in these parts? On the contrary, she promptly resents its presence, and by violent sneezing, coughing, and retching, exerts herself to reject it.

Such is faithful, generous, patient Nature. It is we, or the anomalies of our artificial life, that are usually to blame for the aches and ailments which haunt our lives.

Modern medicine is a comparatively precise science, and the suffering humanity of the present day are much better off than their grandparents in the resources of the healing art. But better even than good doctoring is the art of preventing disease, and strangely enough, this branch of medical treatment—the most im-

portant in a sense—seldom comes, or is seldom brought under the direction of the physician, whose chief function is apparently confined to drugging. Let each person therefore, by familiarising himself with the leading principles of Physiology, and applying them to the rules of daily life, constitute himself his own preventive doctor.

Liability to Colds from Nervous Causes.—The mode in which animal heat is generated and regulated being clearly understood, the rules for the preventive treatment of colds lie in a nutshell. First, then, we shall speak of the Nervous System, as the most important factor in heat regulation. It is an essential condition for the due administration of animal heat, that the nervous system be in a healthy condition. If it be irritable and respond too readily to external impressions, or sluggish and slow to convey stimuli, it equally operates in vitiating the orderly government of this important department. For instance, a person with a feeble or disordered nervous system is easily thrown into a state of uncomfortable heat or perspiration, because enfeebled nerves are incompetent to control the supply of blood to the surface capillaries. The consequence of that again is, that he is apt to be chilled and to take cold by the rapid evaporation of the moisture on the skin. Due attention, therefore, to the state of the

nervous system is the first aphorism in the preventive treatment of colds. Fresh air, exercise, and nervine tonics are the best remedies for strengthening the nervous system, while all enervating influences, such as late hours, over-indulgence in alcoholic liquors, undue exertion of mind and body, excessive smoking, worry, anxiety, and depressing emotions are to be avoided. When depressed and out of sorts from any cause, the liability to take cold is increased, and special precautions should be taken to protect the body from cold when exposing ourselves at such times. As we have said in a previous chapter, what we have to cope with is, relative cold as measured or estimated by our varying nervous perception, and not the actual condition of the atmosphere as indicated by the thermometer. If our nervous system is depressed, our power of resisting cold is lowered, and it is the same thing practically, whether the attacking force is augmented or the prey enfeebled.

Excessive Clothing as a cause of Catarrh.—Excessive clothing should also be avoided as a fruitful cause of colds. By piling too many clothes on us, an undue amount of heat accumulates on the surface, compared with which, the temperature even of ordinary air is relatively cold, and a chill is the result. This error should be especially avoided by those who lead active

lives, or who habitually undergo severe bodily exertion, for under these circumstances too large a quantity of sensible perspiration accumulates on the skin, the rapid evaporation of which robs the body of an undue amount of animal heat.

Draughts. — Draughts are dangerous, and should be carefully avoided, as the cold current causes the body to give up its heat very rapidly. Damp clothes are perilous from the rapid evaporation they induce. Going out into the cold air after partaking of stimulants is a pernicious practice, though regularly resorted to by many people under the false impression that it is a protection against cold. It is a perfidious fallacy. The effect of alcohol is to dilate the surface capillaries and to produce a sensation of warmth, this sensation being derived from the cutaneous nerves. The capillaries being relaxed, loss of heat goes on unchecked, and the internal organs are fast getting chilled, while the cutaneous nerves lull us into a treacherous sense of security, by conveying an empty sensation of warmth to the brain. When the action of the alcohol is spent and the bloodvessels of the skin—the capillaries—are empty, when the cutaneous nerves are no longer stimulated, we suddenly realize our true condition, and from a state of exalted complacency, we fall to shivering and chattering.

Chills.—Why are we apt to catch cold, if we sit or stand about in the cold when we are warm and perspiring, or after getting wet? Because we allow too great evaporation; and everybody knows that heat, in passing from moisture to vapour, is lost by becoming latent.

By walking about or exercising our muscles in some other way, we bring about increased waste of tissue. In other words, we add fuel to the fire, increase the heat supply, and thus make compensation for the incidental loss.

Anomalous Sensations during Fever.—Let me here say a few words on fever. In fever the temperature rises considerably, the skin feels hot, and the thermometer placed in the armpit shows an actual rise, ranging from 1° to 7° or more over the normal heat. But the sensations of the patient are those of cold. He complains of creepiness and shivering and begs for more covering. This is an apt illustration of the fact that our sensations are no true criterion whatever of the actual temperature of the blood. The explanation is this, that in fever, the capillaries of the skin are empty, and consequently the cutaneous nerves, which are the real media through which sensations of heat and cold are conveyed to the brain, receive the negative impression of cold, and it is *perceived* by the brain as such. The moment the capillaries become charged, perspiration sets in, the sensa-

tion of cold disappears, and abnormal heat begins to subside. One of the principal indications in the treatment of fever therefore is to promote perspiration.

Sudden changes of temperature are to be avoided on account of the risk of collapse of the whole heat-regulating apparatus by shock.

Cleansing of the Skin.—The orifices of the sweat glands, popularly called the *pores* of the skin, are liable to become clogged by the accumulation of dried excretions and particles of dust acquired from the air and clothing. Frequent bathing is therefore necessary to remove these and to preserve the potency of the minute apertures for free exhalation of moisture. To those who can stand it, the daily use of the cold tub is a powerful preventive, by inuring the skin to cold and bracing the nervous system.

Local Irritants as a cause of Catarrh.—Catarrhs are also induced by the direct effect of certain substances on the mucous membrane of the throat and air passages.

Breathing very cold air may thus produce catarrh by its local effect on these parts. Minute particles of wood, steel, cotton, wool and other substances are, by their mechanically irritant effect, capable of producing the same morbid condition of parts as that which characterises what may be called reflex or re-actionary catarrh. The use of ardent spirits, especially in a con-

centrated form, immoderate smoking, and excessive use of the voice may also be classed among the direct irritant causes. They induce a state of chronic congestion in the throat and its neighbourhood, which is ready on the slightest provocation to kindle into acute inflammation. Persons with weak hearts have a special tendency to catarrh, on account of the congestive troubles accompanying deficient heart action and a sluggish circulation. More often, however, the catarrh induced by heart affections, deviates into the stomach ; and some of the most intractable forms of dyspepsia that medical men have to cope with, are those associated with heart disease.

In conclusion, the best protective against colds is, to cultivate such habits and to adopt such modes of life, as tend to harden, invigorate and brace the system, and to avoid effeminacy, silkiness, and coddling.

CHAPTER III.

ON COUGHS—THEIR NATURE, VARIETIES, AND TREATMENT.

CONSISTENTLY with my object in designating these essays *sermons*, I shall take occasion to refer to certain important truths in connection with my subject, and endeavour to deduce from them the practical lesson I wish to convey. It will be the aim of the author, not merely to lay down rules for the guidance of his readers, in matters relating to health, but to explain the principles on which they are framed, entering briefly on such scientific points only as may be necessary to elucidate the subject.

Difference between Symptoms and Disease.—The lesson I desire to inculcate on this occasion is, the importance of distinguishing between symptoms and disease. It may be surmised that I am imposing on myself a gratuitous task—that the distinction is obvious and unmistakable. But it is not so. In the popular mind at least, the error is frequently made of mistaking symptoms for disease, with what results we shall see hereafter. Let me give a few instances. Para

lysis is generally regarded as a disease. It is however not a disease, but a symptom. Paralysis is most frequently the result of apoplexy, where the pressure on the brain of effused blood, extinguishes the functions of all those nerves which issue from that portion of the brain injured by the pressure. The *disease* is in the brain, of which the limb bereft of motion and sensation, is but a manifestation or *symptom.*

Dropsy also is usually reckoned a disease. If one is told that such and such a person is suffering from dropsy, it invariably satisfies the enquirer, though dropsy is nothing more definite than the symptom of at least five different diseases, viz., heart disease, Bright's disease of the kidneys, liver disease, disease of the peritoneum, and certain diseases of the blood. We also hear jaundice spoken of as a disease, but the real disease to which the term refers is an affection of the gall duct, of which jaundice is the prominent symptom. Palpitation, a disease *par excellence* in the estimation of timorous females and morbid hypochondriacs, may be the symptom of nothing more than excessive indulgence in tea or immoderate use of tobacco, or it may be the ominous signal of distress of a heart sinking under the ravages of disease. Colic, another painful condition claiming the title of disease, is the writhings of the intestines labouring to expel irritant matter.

The great difference between disease and symptom is, that the former invariably implies derangement or deterioration in some degree or form, whereas the latter is in the majority of instances the exhibition of a conservative process. I do not say that it is always so. A symptom may be simply a coincidence or sequence of disease, without having any special signification, or a collateral disease may be called a symptom from association. As a rule, however, what we usually call symptoms, will be found to be the result of certain conservative processes or reactions, which Nature sets up to counteract the evil effects of disease. Let me give one or two examples:—Blood poisoning is a disease. What are its leading symptoms? Excessive action of the heart is one, *i.e.*, the effort of this organ by increased labour—by contracting 120 to 150 times in a minute, instead of 70 to 80 times, as in health, to expel the injurious substance from the blood; for the more rapidly blood circulates, the quicker it is likely to get rid of offending substances in it, through the excretions. This symptom therefore is the result of a conservative process. Excessive sweating is another symptom of blood poisoning, and is the effort of another member of the economy, the skin, to do its own share of work in repelling the enemy. Sickness and diarrhœa are also symptoms, and are

the contributions of the stomach and intestines respectively, towards the same conservative object. When any danger threatens the purity of the blood, the excretory organs, like the members of a united clan, combine in common cause against the intruder, each doing its utmost to drive the malignant foe from the peaceful fold.

Take again heart disease, the variety we will suppose, known as valvular disease, where, as a result of rheumatic fever, the valves of the heart are injured and the due propulsion of the blood through its cavities embarrassed. This is the disease, and a most serious one it is. How does Nature act on this emergency? Does she look on with folded hands while the crippled organ, overwhelmed with its troubles and faint with futile resistance, threatens to succumb. It would be very unlike her if she did. True to her temper, she comes to the rescue, and in view of the increased demands on the heart's action, endows it with more muscle, taking for her motto, "As thy need, so shall thy strength be"—just as Government sends out reinforcements to meet a military contingency. How much truth there is in Emerson's words, "it takes as much life to *conserve* as to *create*," we have an opportunity of judging by the evidences here adduced. Increased power is employed to overcome the

obstacle, and the subjective symptom we call palpitation, is the sensation of this conservative action of the heart.

Shortness of breath—another symptom of heart disease—is the struggles of the lungs to overcome a mechanical difficulty produced by obstructed circulation and a congestive state of those organs. Cough is another symptom, and is an attempt on the part of Nature to clear the bronchial tubes of the mucous products of congestion.

Dropsy, another leading symptom, is a result of obstruction of the circulation and consequent stagnation of the blood in the veins, the fluid portion of the blood oozing out into the tissues, and thus relieving itself of the abnormal hydraulic pressure.

Jaundice is produced when, from any cause, such as inflammation or the impaction of gall stones in the gall duct, the bile or gall is obstructed from flowing into its natural outlet, the intestines, and the pent-up matter seeks relief by escaping into the blood, tinging it with its peculiar colour and imparting its characteristic yellow hue to the skin through which it circulates. Colic, as we have said before, is caused by the spasmodic contraction of the intestines in their endeavour to expel undigested and irritant matter. Pain itself, the cardinal symptom—the symptom of symptoms—is the

greatest conservator and guardian of animal life and health. It promptly warns us of approaching danger—as we know from our acute sensations on the slightest burn, when otherwise we might be charred to the bone before perceiving the injury—and when rest is essential for the recovery of an injured limb or a diseased organ, pain compels us by a power we can ill afford to resist, to refrain from movement.

Now I think I have said enough to show that the symptoms of disease may be accepted as the expression of a conservative reaction, to meet the contingencies of such disease. This being so, it becomes a matter of vital importance not to mistake the one for the other, and to treat symptoms instead of disease. By so doing, we oppose the wise dispensations of Providence, alienate our best ally, Nature, and by our officiousness and bungling, make the last state of our patient infinitely worse than the first.

Definition of Cough.—Let us now ask ourselves, what is cough? How the hapless martyr to it would smile scorn at the question! It is enough for him to feel the irresistible impulse convulsing his sides and fretting his frame, breaking through his slumbers and making night as well as day a torment grievous to be borne, without waiting to ask, "What is cough?" and getting for answer, the miserable

crumbs of comfort contained in a scientific definition. His wretched experience tells him too well what cough is, and the nearest chemist's shop, where he could purchase a moment's stupor from Paregoric Elixir, is his chief concern, and speculative science may go to the winds.

Cough is the result of a combination of muscles acting together to expel some foreign substance irritating the air passages. It is essentially a conservative act for maintaining these passages free for the entrance and exit of air. It is a symptomatic phenomenon, and not a disease *per se.* Coughing is an *involuntary* or *reflex* act. We call it involuntary, because it is independent of the will. If Nature left these conservative processes to be regulated by the will, it is a question whether they would be conducted with the same promptness and efficiency as under the existing arrangement. We might lose our presence of mind on an emergency, or when danger threatened them, we might fail to realise the peril. Even though we did, we certainly could not adopt means more energetic than those wisely ordained for us, and planted beyond our control. We call it *reflex*, because the impression of irritation is conveyed by the sensory nerves to the nerve centres, and there bent or turned back, as it were, into the motor nerves controlling the

group of muscles exercised in the act of coughing, without any reference to the will. The act of breathing is another example of involuntary or reflex action. The sensation of want of oxygen is conducted to the nerve centres, and thence to the motor nerves supplying the muscles called into play in the collective act of respiration. If the function of respiration were left to the direction of the will, we should probably forget to breathe when our attention was absorbed in other matters, and it would be utterly neglected during sleep, when the will is dormant. It would never do to leave functions of such vital importance to the mercy of an erratic and capricious will. Nature, therefore, wisely removes them from our management, and places them under automatic government. The most frequent cause of cough is the accumulation of expectoration in the air tubes.

Varieties of Cough.—There are a great variety of coughs, which may be grouped according to their character and source. Thus, a *dry* cough is one that is unattended by expectoration, and a *loose* cough is one accompanied by expectoration. A *hard* metallic or *brassy* cough is one in which the vocal cords are affected, the vibration of which, during the act of coughing, produces the peculiar ringing sound, as in croup. *Irritable* coughs are those which result from tickling or irritation of the passages by an elongated and

relaxed uvula, or from the hypersensitiveness produced in the mucous membrane, during the first stages of inflammatory catarrh. The *barking* cough is usually the result of hysteria or nervousness, confirmed by habit, and is almost exclusively a complaint of timid, sensitive young females. There is also the *stomach* cough produced by long continued dyspepsia, the stomach, the lungs and air passages being intimately connected through the medium of nerves. Certain diseased conditions of the liver, the gall duct, and brain, are also admitted by eminent medical authority to give rise to coughs through the complex sympathy of nerves. A *hollow* cough is so called on account of a certain resonance, which characterises the cough when the lungs are extensively diseased by consumption. The *spasmodic* cough is one where the spasmodic element unduly preponderates over voluntary effort and causes a paroxysm. Irritable conditions of the nervous system often tend to protract these coughs long after the original causes have been removed. *Whooping* cough is characterised by a *whoop*, which is caused by air rushing in through a spasmodically closed windpipe after a fit of coughing. A single sharp cough is characteristic of the disease we call *Pleurisy*, where the pleura—the membrane covering the lungs and lining the chest walls—is inflamed, and is of great assistance to the physician in

diagnosing the disease. It also occurs in the first stages of inflammation of the lungs and consumption.

Cough not a Disease but a Conservative Provision, and to be treated as such.—Seeing, then, that cough is a distinctly conservative act, we must be careful how we check it. Our interference must be confined to moderating its intensity, when it is excessive and out of all proportion to the occasion. In cases where the bronchi are loaded with expectoration, if we administer powerful remedies such as opiates, to check the cough, the result might be fatal, especially in old people and young children. Nature's efforts to get rid of the offending material being checked, the minute tubes become clogged and impermeable to air, leading to failure of respiration, collapse of the air cells and death from suffocation. Such is an example of the danger of treating symptoms instead of the disease. When children are distressed with an abundance of mucus in the bronchial tubes, as they have not the sense to aid the natural impulse by voluntary efforts to expectorate, the most efficient remedy is to administer an emetic, which effectually clears the tubes. The best emetic for children is a teaspoonful of ipecacuanha wine in sweetened water administered every quarter of an hour until vomiting takes place. In old people the tendency is generally

to excessive secretion from feebleness of the system. In their case, it is usual to combine expectorant medicines with astringents to check excessive secretion, and tonics to give tone to the system. If narcotics are given to allay cough in the foregoing cases, while the tubes are loaded, the results are certain to be disastrous.

Cough requires Special Treatment if accompanied by Fever.—The first thing to do before administering remedies for cough, is to ascertain whether it is accompanied by fever. This can only be done with the help of the thermometer. Acute bronchitis is always attended with increase of temperature; and when fever is present, the use of the ordinary mixtures tends invariably to aggravate the cough and increase general distress. Ipecacuanha wine is the only remedy which may be used safely for the relief of cough irrespective of the presence of fever. It may be taken in five-drop doses, diluted with a teaspoonful of glycerine and a little water, every three hours. For children, smaller doses will be required, say, two or three drops; and there is no safer nor more appropriate medicine in the whole Pharmacopeia. Mothers can never err in administering it to their children, if they do not desire to have medical assistance. In bronchitis also this is a correct remedy, supplemented by the use of linseed poultices to the chest in adults and older children, and to the

back and chest in very young children, the bulk of the lungs in the last being situated at the back beneath the shoulder blades. To allay irritation and preserve the mucous membrane of the throat in a moist condition, glycerine jujubes may be used. If fever be known to be present, the ipecacuanha may be combined with small doses of sweet spirits of nitre, or a few grains of nitre dissolved in water. If the fever abate by the employment of these remedies, the cough also frequently subsides without special remedies to allay the latter. The disease being cured, the symptom also usually disappears. But cough often remains by sheer force of habit after the exciting cause is removed, and then we have no hesitation in taking prompt measures to check it. A cough mixture usually consists of a combination of an expectorant with a narcotic, and the different varieties of drugs used and the number of ingredients employed are legion, varying with the necessities of each case and with the ideas of the prescriber. When expectoration is excessive, it is useful to employ acids. Even raspberry vinegar or lime juice often serves the purpose.

Irritant Coughs.—The class of irritant spasmodic coughs must be treated by different remedies, such as chloral, morphia, prussic acid, chloric ether, opium, &c., combined with a

demulcent, such as dissolved gum or glycerine, the latter remedies being also useful by their mechanical property of clinging to the parts about the throat.

Sympathetic Coughs.—Those coughs again, which are the sympathetic signs of disorder in the stomach and liver, must be attacked by treatment directed to the relief of those organs.

CHAPTER IV.

VIS MEDICATRIX NATURÆ.

He takes an ignoble view of the medical craft who imagines that the whole duty of doctors consists in administering physic. The part which drugs play in a course of judicious, thoughtful treatment is often a comparatively minor one. The first duty of the physician is to study nature—to comprehend her in all her attitudes and all her moods, to sit meekly at her feet and learn patiently the lessons she teaches; to administer to her in want and woe; to soothe, to encourage, to guide, to check and otherwise assist her, as occasion demands; and medicine is only one of the agents employed in this service. Nature is the great restorer, not man. Not physic, but Nature glazes and seals the bleeding surfaces of an incised wound, or throws out healthy tissue to fill up the gaps and jagged cavities of a corroding ulcer. Not the pills and potions of learned doctors, but Nature with healing in its wings, hovering over the sick one, cools the fevered brow, and brings the glad tidings of dawning health to the weary sufferer.

Who nurtures the creeping thing, the denizen of the air and of the waters, when it is wounded—the wild beast licking its wounds in its solitary lair, or the luckless bird as he hobbles away on one leg, the victim of some cruel boy's sport? Is there no balm for the sufferings of these humble creatures, apart from that which flows from the Royal College of Physicians or the Apothecaries' Hall? Must they lie down and die, these forlorn and friendless fellow-sufferers, because, forsooth, there is no surgeon at hand with lint and with balsam to bind up their wounds, or a physician with his omnipotent draught and pill to lull their pains? They have better attendance, these *protégés* of Nature, in a sense, than the patients of an erring Faculty. The most skilful, the most experienced doctor, may err, and he is not the last to own his fallibility; but Nature is infallible. As soon may we look for the subversion of the laws of attraction—which impartially regulate the grand movements of the heavenly bodies in their respective spheres, as well as that of the tiny drop of fluid ascending in the capillary tube—as expect Nature to fail in the fixed laws which govern the natural and unaided healing processes. Where failure occurs, it is attributable to extrinsic conditions unfavourable to Nature and thwarting her designs. None can accuse her of being false to her principles.

If Nature were fickle and capricious, there could be no such thing as scientific medicine, or science of any kind. For instance, is Nature ever known to have thrown out new material to cement the broken ends of a fractured bone, by mistake, when no fracture existed; or was she ever known, under ordinary circumstances, to overlook the reparation of bone when the occurrence of fracture rendered it imperative. Broken bones, it is true, occasionally refuse to heal from some constitutional vice referable to the individual, but never from simple failure of Nature. If a foreign substance pierce the skin and become located in the tissues, is there the slightest possibility of Nature overlooking the wrong done to her? Does she ever fail to resent the injury by inflammatory protest and patient dogged endeavours to the last to expel the intruder? How else could the experienced surgeon confidently predict inflammation and suppuration under such circumstances, unless Nature were uniformly true and inviolable? On the contrary, he knows the foreign substance must be extracted, if these untoward events are to be avoided, and that there can be no compromising with Nature to make exceptions to her rule.

While unstintingly giving Nature her due, it must still be admitted that a very great deal can be done to assist her operations, by abetting her in all her plans, removing obstacles from her

path, and otherwise acting towards her the part of a sagacious and able confederate. This is exactly the *rôle* of the physician. He has moreover to check the impetuosity of Nature, when she is carried away, as it were, by the wealth of her resources, just as the mind of ordinary capacity often controls a gifted one.

What accomplishments are necessary to qualify a person to hold this position under Nature? To begin with, he must thoroughly understand the construction of the human frame, its behaviour in health and disease, the nature and forces of the agents he employs as medicaments, be they drugs or other agents, such as dietetic and sanitary measures — the limpid panacea of the hydropath or the inert globules and mother tinctures of the homœopath, not to be dignified by the name of drug; and above all he must study Nature in all her phases, and cultivate the faculty of observation at the bedside.

The prescription is evidently the *denoument* of a physician's accomplishments, the palpable embodiment of all his mysterious knowledge, and by the prescription he must stand or fall. His fame and reputation are pinned to the scrap of paper disfigured with undecipherable hieroglyphics or affixed to the phial of murky compound called the "mixture." But the thoughtful consideration of the case, the complex reasoning, the judicial sifting of conflicting evidence, the

correct interpretation of mysterious and contradictory symptoms, the hopes, fears, and anticipations, the unravelling of the tangled skein, the creating of light and order out of chaos, which every skilled and conscientious practitioner brings to bear on each individual case, be it great or small, for which he is consulted, and on which his reputation and success properly depend—these, I say, go for nothing in the commercial transaction of paying a fee and receiving medical advice. The administration of medicine is not *the* thing in treatment. It is the true appreciation of the state of affairs and the knowledge of what one is about. The whole duty of doctors *is* the administration of medicine, only in as far as the latter is held as an index to the complexity and travail of the labours which give it birth.

Neither is medicine the gross power which popular esteem makes of it. Many people have no faith in medicine unless it smells and tastes strong, the idea being that it effects its purpose by virtue of its own strength and not by virtue of its gentle influence on the strength of Nature. Great vessels are commanded by a diminutive helm, fiery horses are curbed by the mere touch of the rein, and a whole army is swayed hither and thither by one individnal mind. So also Nature, fierce in some of her bitterest moods, is nevertheless as doçile as a child, in the hands of a rational physician.

CHAPTER V.

PROGNOSTICS OF DISEASE AND THEIR INTERPRETATION.

DISEASE is often foreshadowed by certain premonitory signs and symptoms which, similar to the terrestrial perturbations before an earthquake, or the mutterings and grumblings that precede a volcanic eruption, gather like an ominous cloud in the horizon and presage the coming storm. These are as closely studied and observed by medical men as weather prognostics by the meteorologist or the mariner, and are taken advantage of for making suitable preparations for meeting the coming event. During the course of disease also, certain favourable signs occur, like a peep of bright blue sky amid heavy masses of dark cloud, by which we are enabled to predict a hopeful termination of the case; while others again of sinister omen make their appearance only to denote impending trouble and danger. Lastly, we have the appalling symptoms, whose dark presence chases away the last lingering ray of hope, and forebodes with awful certainty the approach of

dissolution. The import of these signs or prognostics may be studied to some advantage by those whose duty it is to watch the sick, either as regular nurses or by the necessity of family obligations.

During an epidemic of scarlet fever for example, it is the duty of mothers to watch their children closely for signs of infection. If a child at such a time becomes sick and complains of sore throat, the probability is very great that it is contracting the disease, and it is a manifest advantage to know this beforehand, that the doctor may be sent for at once, and that the child may be placed as early as possible under proper medical treatment. If again, during the height of a fever, copious perspiration takes place, with a simultaneous fall in the temperature of the patient; or if, in the case of a child, a free bleeding from the nose occurs, we are fully justified in putting a favourable interpretation on the events, and predicting recovery. If, on the contrary, the temperature runs up to 107°, we are compelled to admit that the case is one of great gravity, and if the fever runs much higher than this there is little or no hope of recovery.

There is nothing that the experienced practitioner dreads more than those terrible symptoms that are the certain harbingers of a fatal termination. They often steal on the scene like

unwelcome spectres when they are little expected, and not infrequently when some delusive improvement has raised our hopes for the better, as if to give depth to despair. There is a relentless cruelty about them. They are the black indices of a stern unpitying fate.

Not long ago, a melancholy duty devolved on the writer in connection with the case of an infant six months old, whom he had been attending for an inflammatory affection of the brain. The mother of the child, with all a fond mother's instincts, watched her little charge hour by hour through the solitary watches of the night as well as by day, and yearning for some token of recovery—some little symptom to bid her hope. One morning saw the poor little thing freed for a moment from its pains and convulsions, and nestling quietly in its parent's lap, the mother shedding tears of joy at the unexpected change for the better. One little symptom, however, which the child had developed since it was last seen, viz., a squint, showed that the improvement was a delusion and that recovery was hopeless. It was a painful task to communicate the fact to the mother and crush the new-born hope within her, but it would have been more cruel to permit her to indulge the delusion longer.

Peculiar Symptoms due to Worms. — The presence of worms in the intestines in children

gives rise to many peculiar symptoms, which are all referable, however, to irritation of the nervous system by these parasites. Grinding of the teeth during sleep is a very common one. So also is perpetual picking of the nostrils. A swollen or tumefied condition of the lips, and a voracious appetite, combined with an ill-nourished condition of the body, are not an infrequent trio, appearing together as a sign of worms. The most important symptom, however, is the occurrence of certain kinds of fits, resembling epilepsy, for which they are sometimes mistaken by the unwary. The fits are not unlike epileptic fits, and naturally cause the gravest fears and anxiety in the minds of the patient's friends. The consequence, also, of not recognising the true cause in time is serious, for not only is the source of irritation allowed to remain and increase, but the innocent victim is made the object of a species of undesirable compassion, with which persons liable to fits are usually regarded, and the harm that may be thus done to a sensitive shrinking nature is incalculable—not to speak of the injury that may be inflicted by potent drugs administered for the purpose of curing a disease which does not exist.

Inspection of the Tongue in Illness.—The tongue is a frequent tell-tale of certain important conditions of the system. In the course of

fevers, much may be learned by asking the patient to put out his tongue. If he finds difficulty in doing so, or if the tongue trembles in the attempt, and if there is at the same time hesitation and tremulousness of speech, it is a sure sign of dangerous prostration of the powers. An illness begun under these unfavourable auspices, if it do not terminate fatally, is sure to be of long continuance, accompanied by great debility and tending to a tardy recovery, and brandy and beef tea will have to be the watch-words of the nurse. In most fevers, at the early stage the tongue presents a thick white coat or fur on its surface, which is moist to begin with. The medical attendant carefully watches the condition of this organ, asking at each visit to see it. If the coat begins to clear away, and does so gradually and equally, commencing at the edge, recovery is taking place and will be satisfactory. If it clear in patches, it is not so satisfactory, and recovery will probably be retarded or arrested by some untoward event. If the tongue become dry and harsh like a rasp, while the coat changes its colour from white to brown, dangerous weakness is supervening, and unless stimulants and concentrated nourishment be administered immediately, and with an unsparing hand, the patient will surely sink. A dry and brown tongue is a sure sign that stimulants are urgently required, and that it

will be tolerated in large doses. It is remarkable how much brandy may be taken with impunity in certain excessively weakened conditions of the system. I can testify to one case occurring in my practice, where an old lady, who was seriously prostrated by an alarming hæmorrhage from the nose, consumed more than half a bottle of brandy in six hours, and it was the means of saving her life. There was not the slightest symptom of intoxication, although when in her ordinary health, this lady, her husband informed me, could not take the smallest quantity of brandy without experiencing uncomfortable sensations in her head.

Dyspepsia is accompanied by a more or less furred state of the tongue. In liver disorders the furring takes on a yellowish tinge. A highly glazed, bright, raw-looking, or patchy tongue betokens inflammatory conditions of the stomach. In scarlet fever, the tongue has quite a character of its own, not observable in any other complaint. Numerous little red points appear through the fur, giving the tongue what is called a *strawberry* appearance, by which alone scarlatina may often be recognised.

Appearances of the Eye.—The appearances of the eye are of greatest service, when considered in connection with disorders of the brain. At the commencement of inflammation of the brain, the pupil of the eye is contracted, indicating

irritation of the great nerve centre. In the later stages, when as a product of inflammation, fluid is effused and presses on the brain, the pupil becomes dilated as a result of paralysis of the brain. When, therefore, in the course of brain disease, sudden dilatation follows upon a contracted state of the pupil, we know exactly what has taken place internally to give rise to the change, and modify our treatment accordingly to suit the altered circumstances of the case.

In health, the eye shrinks before a strong light, the pupil contracting by reflex action, to guard the tender retina from the injurious stimulus of powerful rays of light. If a candle be held close to the eyes, it will be observed that the pupils are in a state of close contraction, and as the candle is withdrawn, the pupils gradually resume their usual size. This property of the eye is called its *sensibility to light.* When it is lost, it indicates a condition of profound insensibility, as in persons under the influence of chloroform or an epileptic fit, and in some other abnormal conditions of the brain. The opposite condition, viz., increased sensibility to light, is also frequently seen, and is a sign of irritation in the brain or the structures of the eye. It is frequently associated with the exalted sensibility that usually accompanies hysteria. If the two pupils be observed during the course of brain

disease to be unequally contracted, or if squinting supervene in the latter stages, the prognosis is rendered extremely unfavourable.

While on the subject of brain disease, I may mention yet another prognostic of most unfavourable import, and frequently observable in rapidly fatal cases of brain disease in children. The symptom referred to is a peculiar constant motion of the lips as though the child were busy sucking something in its mouth. Once seen, this symptom is never forgotten, as, together with a characteristic restlessness and alarmed expression of face, it makes up a bedside picture painful to contemplate.

Brain disease is not infrequently foreshadowed by prognostics connected with perversion of sight, such as a mistiness, or spots before the eyes, flies floating in the air, objects appearing double, and other strange disturbances. Occasionally patients are the subject of spectral illusions, as in the remarkable case of Mrs A., quoted by Sir David Brewster in his "Natural Magic." In elderly people, a peculiar pale-coloured opaque ring is occasionally to be seen round the edge of the coloured portion of the eye, which is now understood to be a sign of some importance, as indicating the probable presence of fatty degeneration in the internal organs. Although it can tell us nothing by itself, it is a highly suggestive symptom, and,

taken in connection with other concurrent evidence, is a valuable aid in detecting degeneration or decay of the various organs. This peculiar appearance is called *Arcus senilis*. When it is present, and when at the same time there is a feeble pulse and great liability to attacks of fainting, we are warranted in inferring that the muscular fibres of the heart are undergoing fatty degeneration.

When patients sleep with the lids half-closed, it is a sign of exhaustion. Children who are brought to the last extremity through chronic and neglected indigestion, and inability to assimilate their food, often display this symptom, as well as older people reduced to great weakness by hæmorrhagic or other discharges. Dark circles round the eye and burning of the lids also denote exhaustion in a minor degree.

Irregularities of the Sense of Hearing as Signs of Disease.—Irregularities connected with the sense of hearing also furnish some important prognostics. Preternatural acuteness of hearing is sometimes observed to be a precursor of delirium, and its occurrence in the course of a severe illness is generally understood to be an unfavourable sign. The opposite condition, viz., obtuseness of hearing, though of less significance as a prognostic, is an unwelcome symptom when associated with organic brain disease, concussion of the brain, or epilepsy.

The sense of hearing is often perverted, and patients complain of annoying noises in the ears, which they variously compare to the singing or hissing of a teakettle, the rushing of the wind, the roaring of the sea, or the beat of a drum. They may be the forewarnings of a fit of apoplexy, or simply the precursors of a bleeding from the nose. Excessive accumulation of waxy secretion in the ears may produce these sounds, or they may be the symptoms of destructive ear disease. Their greatest practical value however is in connection with poverty of blood, of which they are a sure indicator when associated with a blanched condition of the lips. Young females, especially servant girls, are very liable to anœmia or poverty of blood. Every trace of colour vanishes from the face, the lips are bloodless, the ears are constantly assailed with ringing or roaring sounds, the countenance is expressive of weariness, energy is gone and langour and apathy prevail. Anœmia is a condition by no means to be trifled with, leading in some pernicious forms to a rapidly fatal issue, and in others, laying the foundation of future organic disease.

Dropsy an Evil Prognostic. — Dropsy is a symptom that always forebodes evil. Exceptionally it is referable to temporary conditions of the blood, on the improvement of which this form of dropsy, never very marked, soon disap-

pears. But in the majority of cases it is an incident of grave organic disease, and its appearance is a signal that the quiescent stages are passed, and that calamity and disaster are approaching.

A slight puffiness of the eyelids is often the first symptom manifesting itself in Bright's disease of the kidneys. Later on, the victims of this melody develop a highly characteristic expression of countenance, consisting of pale, puffy features and a dry, harsh, and pasty skin, very suggestive, to the practised observer, of kidney disease. In heart disease, dropsy usually makes its appearance *first* in the lower extremity; and in disease of the liver, fluid first makes its appearance in the abdomen. Dropsy is a simple transudation of the watery constituents of the blood through the veins into the surrounding tissues, being the result, either of excessive hydraulic pressure, or an impoverished and attenuated state of the blood. As an illustration of the one, we have obstruction of the circulation caused by an incompetent heart or liver, followed by the blood forcing itself out of its containing vessels and inundating the surrounding tissues. As an example of the other, we see consumptive patients exhibiting symptoms of dropsy in the last stage of the disease, the blood having become so thin and watery that it easily permeates the porous walls of the

veins. The same thing often occurs in women worn out with prolonged suckling. Inflammation of the peritoneum—the membrane lining the abdominal cavity and covering the intestines—also gives rise to dropsy, which is significant or otherwise of danger, according to the cause of the inflammation. If it be due to cancerous or tubercular deposit, the prognosis is necessarily gloomy, while inflammation due to idiopathic or traumatic causes are more amenable to medical treatment.

Signification of Pain in the Back.—Pain in the back is a common complaint; what does it denote? It may be due to lumbago—a rheumatic affection of the muscles of the spine—which may usually be recognised by the pain being aggravated during the act of stooping, and at night, and by rheumatic pains occurring in other parts of the body. When it is persistent, and described by the patient as an aching or weariness in the lower part of the back, it may be due to chronic disease of the kidneys or to some affection of the spinal cord. The great importance, however, attaching to this symptom is derived from its association with disease of the generative organs in women. Wearing high-heeled boots is said to cause pain in the back by disturbing the equilibrium of the muscles employed in maintaining the erect posture, the high heels having a tendency to

throw the body forward and straining the muscles of the back.

Pain in the Side.—Pain in the side is another, frequent complaint. When it is described as a sharp, lancinating pain, aggravated by the movements of breathing, pleurisy, or inflammation of the lungs, is to be feared, especially when attended with cough and fever. The sharp pricking pain—the *stitch* in the side as it is usually called—is generally referable to neuralgia of the ribs, and may be distinguished from inflammatory pain by its shifting character, and by the absence of cough and fever. Flatulency also gives rise to severe stabbing pains in the side, causing no little inconvenience. They may be recognised by their extremely fugitive nature, rapidly vanishing from one spot and suddenly appearing in another. Dull pain in the right side is due to liver disorder, particularly congestive conditions of this organ from intemperance in eating and drinking.

Headache.—Of headaches, there are at least four distinct kinds. When the headache is sharp, confined to one spot, and accompanied by vomiting, constipation, and other signs of cerebral disturbance, it is due to organic mischief in the brain. When accompanied by a sense of fulness and singing in the head, when there is giddiness on moving, and the face is florid, it is a sign of plethora. When along with headache

we have foul breath, furred tongue, pain in the stomach, sickness or disordered bowels, it is referable to indigestion. When occurring in people weakened by some drain on the system, such as hœmorrhage or suckling, or by over study, anxiety, or worry, headache is a symptom of exhaustion. There are also headaches derived from neuralgia, rheumatism, and hysteria, occurring as one phase of these ailments in those subject to them.

Giddiness.—Giddiness, when severe and persistent, and when occurring in elderly people who betray other symptoms of cerebral disorder, is a sign of some gravity, indicating alteration of the structure of the brain. It is sometimes a premonitory symptom of apoplexy. When, however, there are no good grounds for suspecting organic disease, it may be set down to stomach derangement, and the presence of dyspeptic symptoms will very often justify this interpretation.

Various Effects of Flatulence.—A very distressing condition, and one which afflicts a great many people in protean forms, is that of flatulence. Occasionally it is experienced as sharp, stinging, piercing pains, as if a needle were cleaving the tissues beneath the skin. At other times it takes the shape of a dull pain between the shoulders. Shortness of breath, and oppression to an alarming extent are occasionally

induced by flatulence, giving rise, in some extreme cases, to a sense of impending death, and serious disturbance of the nervous system. Fainting is frequently brought about by the same cause, and hysteria may very often be traced to flatulence. Flatulent colic is too well known to need description. Flatulence also occurs as an accompaniment of organic diseases of the liver, peritonitis, typhoid fever, gout and uterine irritation. The people above all who are martyrs to it, are those who have a weak, nervous system, together with a disordered stomach or liver. The best remedies for persistent flatulence are improvement of the nervous system and a simple, carefully regulated diet, while antispasmodics, such as assafœtida pills, and salvolatile, will afford temporary relief, until the system is being restored to its normal healthy condition.

Causes of Flatulence. — In healthy digestion, the food taken into the stomach is acted on by certain juices, such as the gastric juice, bile and pancreatic fluid, which possess antiseptic as well as absorbent properties, reducing the food to a condition fit for absorption, and preventing decomposition. When, however, from any cause these juices are rendered deficient in quantity or quality, fermentation sets in, the food decomposes and gas is liberated. The distended stomach and

intestines become the seat of spasms, which are conveyed by nervous sympathy to distant parts, giving rise to sharp pains in localities remote from, and apparently having no connection with, the centres of disturbance. Thus peas, beans, and other indigestible substances are capable of producing flatulent pains in various parts of the trunk. Deficient secretion of gastric juice is very often due to simple lack of nerve power. Hence, strychnine, which is a nervine tonic, is a potent medicine in many cases of deficient gastric juice. Pepsin and hydrochloric acid may be employed to replace the natural solvent, until the secreting power is recovered. Deficiency of bile is due to obstructive causes in the liver, and is remediable by blue pill or podophyllin resin, the two specifics in this disorder. Where the pancreatic fluid is defective, the capacity for digesting fatty articles of food is diminished. The saliva also serves a distinct chemical purpose in the elaboration of food, so that excessive expectoration, as in tobacco smoking, interferes with perfect digestion by diminishing the saliva.

The second class of causes producing indigestion and flatulency, is derived from errors connected with the food we eat. Excessive food is the commonest error. We have yet to learn how little is required for the actual wants of the system. Every morsel we take more than we absolutely require, creates an expenditure of so

much extra energy, which is eventually deducted from the aggregate length of days, health and happiness of our lives. Every drop of alcohol of which we partake, increases the beatings of the heart, and every time the heart beats too often, it is one little stage nearer to the final bourne. We may lighten the fleeting moments of life by the use of the spur and the whip, but we may rest assured that the pace will tell in the end.

Improper food is another cause of discord in the stomach. Some kinds of food resist the action of the gastric juice more than others, and the capabilities of even healthy individuals differ widely in this respect, one food disagreeing with some, and another kind disagreeing with others. It is probable that the properties of the gastric juice share in some measure the peculiarities and idiosyncracies of the individual.

Partaking of food at irregular hours is another source of indigestion. Incessant calls on the secreting function can only irritate the glands and vitiate the secretion. The digestions of children, fresh in their young vigour, may escape the evil consequences of such treatment; but staid and mature stomachs will not patiently tolerate the indignity.

The Importance of Rigors as a Prognostic.—A fit of shivering or *rigors* is a prognostic of great importance. It is the precursor of most

inflammatory invasions, and the more prolonged and violent the rigor, the greater the severity and duration of the disease. A fit of shivering during the progress of a disease, indicates some untoward complication or a fresh accession of the disease. A rigor is a clear indication of blood contamination in some form. It is the impression of this contamination on the nervous centres, reflected into the motor nerves, that causes the muscular vibration or shivering. This phenomenon is illustrated in a mild form when we instinctively shudder on experiencing a disagreeable taste or smell.

CHAPTER VI.

REVIEW OF THE SKELETON.

WHAT a wonderful piece of architecture the human body is! We do not require to dive deep into anatomy or physiology, to discover the beauties or wonders of this masterpiece of creation.

It is not necessary to go so far in our examination of it, as the intricacies of the elaborate organs and systems, in order to be filled with awe and admiration towards the great Architect. The dissecting knife and the microscope reveal to the patient student of anatomy, the more elaborate and complex wonders of our being. The experimental physiologist stands face to face with the mysteries of Nature, as they exhibit themselves in organic life. The secrets of functions, such as the circulation and digestion, with all their tangled relations, have been given up to the scientist, and every year almost adds to the victories of physiological discovery. But it is unnecessary to use dissecting knife or microscope, or accompany the scientist in his profounder studies, to appreciate

the mind and hand—if we may use the expression—of Nature, in the human fabric. The contemplation of the skeleton alone will furnish an example of the wisdom, the adaptability and the thoroughness, which characterize the planning and building of Nature's highest work —man.

Before criticising the skeleton however, let us take a general survey of the whole production. We have the bony skeleton to begin with, the foundation of the noble super-structure, an embodiment of strength, correct mechanism, and perfect adaptability, of which we shall speak more particularly hereafter. Next come the muscles, beautifully modelled and lying layer upon layer clothing the bones, whose outlines, dimly visible under the tegument, have been the favourite subject of artists from time immemorial. Their powerful contractions, in endless co-ordinated movements, produce motion and locomotion. The faint smile on beauty's face, as well as the iron grip of some sinewy son of Vulcan, is equally the result of muscular contraction. The fine purposive movements of the tongue in speech, and the wild erratic convulsions of an epileptic fit, are phenomena produced by the same mechanical agency of muscles in action.

The muscles, however, are inoperative without some means of communication between

them and the brain, which receives the mandates of the will. Nerves therefore issue from the brain to every part of the body. If not from the brain directly, they issue from the spinal cord, which is practically a prolongation of the brain down the spinal column. These nerves act like telegraphic wires, sending messages to the brain relating to the sensory condition of various parts of the body, and bringing orders to the various groups of muscles from the great nerve centre. For instance, when the hands feel cold, the sensation is conveyed through the sensory nerves to the brain. The mind is thus made cognizant of the condition and plans a remedy, which the brain telegraphs through the motor wires, to certain groups of muscles. These are immediately set in motion, their combined movements producing the rubbing of the hands together, or holding them before the fire for warmth, as the case may be.

But neither the bones, muscles, nor nerves can live and perform their functions without food or nourishment, since they are organic structures. Blood is therefore provided to meet this end—blood, which bears in its crimson stream the sustenance for bone, brain, muscle, nerve, and every other structure of the body; blood, which flows hissing before the powerful ventricular contractions of the heart, mingling its muffled roar with the flapping of the cardiac valves,

traversing arteries, capillaries, and veins in its circulatory course, feeding the tissues on its way and sweeping away the refuse. But the blood cannot impart nourishment without itself being replenished. We therefore have the digestive system, which receives food in a crude form; and having submitted it to the elaborate processes of digestion, pours the prepared produce into the blood current.

Let us now examine the skeleton a little more closely. The sight, or even mention, of a skeleton is probably suggestive to most people of grim horror, being associated with death and decay. But it is actually a beautiful structure, for beauty is the expression of the fitness of a thing, and where shall we find a structure better fitted for the purpose for which it was created, than the skeleton? Take first the skull, an incompressible box, affording secure protection for the brain, and locating the four special senses, sight, smell, hearing, and taste. The bones of the skull are chiefly of the flat type, whose main function is to afford protection. The brain being the most important, as well as the most fragile organ, requires special protection, which is afforded by the dense hard bone composing the vault. The series of bones forming the spinal column securely encloses the cord, and at the same time permits free movement of the spine. The

ribs enclose a space, within which those delicate organs, the lungs and heart, are securely packed, while the elasticity of the ribs plays an important part in the mechanism of breathing. The pelvis encloses another cavity, for the accommodation of the bladder and uterus. The wing-like processes of bone on either hip, afford convenient attachment to powerful muscles. The female pelvis is distinguished from that of the male, by certain important characteristics, on account of the special functions belonging to the former. We have next the long lever bones of the arm and the leg, with the prehensile appendages, the hand and foot, all admirably adapted for the purposes for which they were intended. The manner in which the movements of pronation and supination of the hand are accomplished, is a marvel of effective simplicity. The two bones of the forearm, the radius and the ulna, lie flat, and side by side, in the act of *supination*, that is, when the hand lies with the palm upwards. In the act of *pronation*, that is, turning the hand back uppermost, the broad inferior end of the radius, the bone nearest the thumb, describes the arc of a circle, and the radius moves obliquely across the ulna, the upper end of the radius moving in a pivot attached to the superior extremity of its neighbour, the ulna. When the arm is midway between pronation and supination, that is, with

the thumb upwards, and the palm of the hand facing the chest, the two bones are still parallel, but no longer with their flat surfaces, but their edges, looking up and down. The brain and spinal cord are protected from concussion by the obliquity of the shaft and of the neck of the thigh bone. The elasticity of the foot, derived from the number of tarsal bones, all kept apart from one another by sacs of lubricating fluid, also combine in preventing the transmission of shocks to the brain and spine. So that when a person strikes the ground with his foot, the force of the concussion is expended chiefly on the series of tarsal and metatarsal bones forming the foot and ankle, and on the long shafts of the thigh bones; and by the time it reaches the trunk, the momentum is considerably weakened, if not entirely dissipated. The importance of this conservative arrangement can only be appreciated by those who fully understand the nature of the brain and spinal cord. There is nothing that inflicts greater injury on the nervous system than those disturbances, either emotional or physical, which we call shocks. Their disastrous effects will often lie latent for years, and reveal themselves unexpectedly in some grave affection of the brain or spinal cord. Idiocy, mania, and softening of the brain may follow on some sudden fright, or a period of great suspense and anxiety, while the develop-

ment of paralysis is a common result of railway collisions. Bicycle riding is also said to be injurious to the spine. This must have been especially the case in the days of the *bone shakers;* but with the modern improvements in the saddle springs, the danger is reduced to its minimum. I think there can be little doubt that those who spend a great deal of their time in driving, especially over rough country roads, must be injuriously affected to a certain extent by the vibrations and jolting of the vehicle. In the sitting posture, of course, there is nothing to break the force of the concussions, and the spinal column is placed in the most favourable position for receiving the shocks. Had a clumsy architect designed the human frame, our nervous system would receive a shock every time we put our foot to the ground, and any such frivolity as jumping, leaping, or hopping would be visited by serious concussion of the brain and spinal cord.

In the upper extremity also, we see a similar provision. The arm is not joined directly to the trunk, but through the medium of the scapula or shoulder blade. The only bony connection between the shoulder blade and the trunk, is through the medium of the clavicle or collar bone. The collar bone has a double curve like the letter S, so that the possibility of shocks to the trunk through falls or blows on

the hand, is almost entirely averted. A force strong enough to run the gauntlet of this protection, will be strong enough probably to fracture the collar bone. When the arm is extended, blows or falls on the palm of the hand are conveyed directly to the collar bone, and so great is the strain on it, that not even its great strength and its curved shape can save it from snapping. Hence we find in practice, that fracture of the collar bone is most commonly produced by falls on the hand, the patient having put out his extended arm to save himself from falling.

Our review of the skeleton would not be complete without some notice of the joints. Apart from the fine ingenuity of their mechanism, joints have a painful interest for us as the seat of rheumatic, gouty, and other inflammatory affections, which form such a large proportion of the diseases to which we are liable. In a typical joint such as the shoulder or hip, both the head of the bone and its socket are lined by smooth cartilage, and the articular surfaces are lubricated by an oily fluid called synovia, which is secreted by the synovial sac in which the joint is enclosed. The articular surfaces are held together by the contraction of the surrounding muscles, by fibrous bands round the articulations called ligaments and by atmospheric pressure. Moreover, in a typical articu-

lation, the joint is freely moveable. All the joints, however, are not of this type. The joints in the cranium, for instance, are neither moveable, nor provided with cartilage, ligaments and synovial sac, but simply rugged edges of bone locked together by interlacing. The hip and shoulder joints are examples of the ball and socket principle, the highest form of joint, and allowing the widest range of movements. The elbow joint and the joints of the fingers are examples of the hinge joint, in which only one kind of motion can take place. A form of double hinge or saddle-shaped joint, in which each of the two articulating bones form a partial socket and roller, with two axes of rotation placed more or less at right angles with each other, occurs between the thumb and one of the wrist bones. The knee joint is an example of the spiral joint, where the surface of the roller does not run true, but becomes eccentric. The articulation of the head of the radius, which rotates in a ligamentous ring attached to the ulna, is an example of the pivot joint. The vertebræ of the spinal column are jointed together by the interposition of cartilaginous discs, and although as a whole, the spine is capable of considerable flexion, the movement of each joint is very limited. The movements of the head on the spine are effected by a pivot joint. The articulations of the collar bone with

the shoulder blade and chest bone are examples of the gliding joint.

In rheumatism the harmony of the joints is disturbed. Some poisonous material, supposed to be lactic acid, circulating in the blood, is deposited by election in the joints. Inflammation is speedily set up, and a large quantity of morbid fluid is effused into the cavity of the joint, causing swelling, stiffness, and intense pain. If not quickly subdued, the inflammatory action causes disorganization of the joint, and permanent stiffness and deformity are the result.

CHAPTER VII.

BONE AND ITS TROUBLES.

THE chief character of bone, which distinguishes it from the other structures of the body, is its hardness. What is it that gives it this quality? It is almost like a foreign body, this dense hard material embedded in the soft tissues of the animal. It is the preponderance of inorganic compounds that impart to bone its characteristic hardness. While only about thirty parts out of a hundred are composed of organic ingredients, seventy parts or thereabouts consist of earthy matter. By subjecting bone to the action of acids the earthy matter is removed, and the bone becomes soft and pliant like india-rubber. In infants, the earthy matter is deficient, and consequently their bones are more pliant and softer than those of adults. Care should therefore be taken not to let infants, especially heavy infants, attempt standing or walking too soon, as the bones of the leg are liable to become permanently bent by the weight of the body.

Rickets.—In the disease known as rickets,

there is a deficiency of earthy matter in the bones, which therefore become bent and produce various deformities of the trunk as well as extremities. Rickets is a disease of children between the ages of six months and three years. Early dentition, excessive sweating of the scalp, large size of the head, and a protuberant abdomen are said to be symptoms of rickets. Adults are also subject to a species of rickets called *Mollities Ossium*, which resembles infantile rickets in so far as it is caused by a deficiency of the earthy constituents of bone, but is a very different disease. While rickets are a common complaint and not usually considered dangerous, Mollities Ossium is extremely rare and almost invariably fatal. Rickets may be considered as the result of tardy ossification. I have already said that in the bones of infants the earthy matter is deficient. As they grow older, however, the deficiency is rectified and the bones harden. In rickets the hardening is unnaturally delayed. But rickets produce no pain nor violent constitutional disturbance. It is very different, however, with mollities. It attacks people, mostly females, whose bones have previously been in a healthy state, the earthy matter of the bones passing away in alarming quantities with the urine, the disturbance is attended with intense pain, seated in the bones, and high fever.

Bones become Brittle by Age.—The organic or animal constituents of bone can only be got rid of by burning. The bone will still retain its shape after the animal portion is burnt off, but on the slightest disturbance it will crumble to pieces for want of the cementing medium. In old people, the animal constituents are apt to be deficient, and therefore their bones are more brittle aud liable to fracture. A very slight fall is sufficient to cause fracture of the thigh bone in a person of advanced years. Fractures are very prevalent among old people, during frosty weather, when the pavements are slippery.

How Bone is nourished.—How is this dense callous material bone nourished? How do vessels or nerves pierce its stony substance, and how does it live? If you take a thin section of bone, and place it under the microscope, you will see how it derives its nourishment. You will see various circular spaces corresponding to channels in the length of the bone, and which are called *Haversian canals*, and round each space you will see arranged, in concentric circles, other linear spaces corresponding to minor channels called *lacunæ;* and spreading on all sides from the *lacunæ*, like feet on a centipede, the numerous channels called *canaliculi.* You will also find closely adhering to the surface of bone, a membrane called the

periosteum, which harbours a perfect plexus of blood vessels, forming a reservoir of blood supply for the use of the bones. Not only blood vessels, but nerves are here stored up and dip into the bone in company .with the nutrient arteries.

Inflammation of the Periosteum.—The periosteum is very liable to inflammation from various causes, such as rheumatism, exposure to intense cold, and injuries. In some subjects a very little injury is sufficient to excite periostitis, and I have known severe inflammation following a slight blow in the shin, which a consumptive girl received from her partner while dancing. People who are worn out with anxiety, insufficient food, and exposure to cold are apt to suffer from it without any apparently exciting cause. It is a very painful complaint, characterised by nocturnal remissions of pain. The affected part is puffy, discoloured, and extremely tender to the touch. The treatment consists of soothing applications and leeches to the part, with internal remedies appropriate to inflammatory states. This disease, which is called *periostitis*, if not checked, often implicates the bone itself. *Ostitis*, as the inflammation of bone is called, is a much graver affection, often ending in destructive disease of the bone, the best means of averting which, is an early use of the knife, to relieve tension.

Abscess of Bone.—Bone is also liable to abscess and suppuration, the same as the soft tissues of the body, and the chief dangers to be feared from those diseases, are destruction of the implicated bone and blood poisoning.

Disease of Bone called Caries.—There is also a disease called *caries*, which usually attacks the more spongy portions of bone, such as the heads of the thigh and arm bones. The bone seems to ulcerate away, and the discharges burrow about under the muscles, and ultimately find their way to the surface by numerous tortuous channels, which riddle the skin and refuse to heal as long as the bone remains diseased. The two classes of people subject to this disease of bone are the scrofulous and the profligate. There is hardly a bone in the body which it does not attack ; but its most frightful ravages are seen in the skull and face, the palate being often eaten away, and the mouth and nose merged into one cavity.

Disease of Bone called Necrosis.—*Necrosis* is a disease in which the bone dies as a whole, and is cast off without being broken down. It usually affects the dense portions of bone, and is frequently met with as a result of debility after fevers, or in the waning constitutions of very aged people. It also occurs in fractures, when the bone is exposed through a wound in the skin, and it is sometimes

caused by irritating substances such as the fumes of phosphorus. Necrosis of the jaw is prevalent among the hands engaged in match manufactories, where phosphorus is much employed.

CHAPTER VIII.

FRACTURE OF BONES.

It is a humiliating thought, that man with all his fine organization, with all his powers of thought and action, is a creature whose life—it is hardly a figure of speech to say—hangs by a thread. The body that breathes and lives to-day, may be cold and lifeless to-morrow. The spirit, on whose tenancy of the mortal clay depends the vital actions, quits the body, and flesh and bones released from vital influences, are acted upon by the forces of Nature and return to the mother earth. How small a thing may cause our death! A few grains of arsenic or strychnine are sufficient to reduce the proud form of man, all glowing with life and health, into a crumpled inanimate heap. If a single pellet of shot from a gun penetrate his heart, or enter a vital part of his brain, this peerless work of creation totters and falls to the ground. In a few minutes the light of life is gone from his eyes, and the cold glassy stare of death has taken its place. The mind that fathoms the sea depths and soars into ethereal space; that

grapples with the forces of nature and tames their fury—this mind with all its faculties and endowments, becomes in one moment a thing of the past. In the full career of his life, with every condition fulfilled for living long, some lethal combination of events occurs in a man's life, some accident happens to the individual, and his place in the world knows him no more. Or perhaps some fatal illness seizes him, and he gradually droops and fades before our eyes like a blighted plant until the flickering flame is extinguished, and corruption feeding on the remains, dust returns to dust. Man's own creations survive him. How many a spire and dome rears its lofty head in silent homage to departed talent! Who can number the books and inventions, which revive in our memories the names of men, whose mortal bodies have long since mingled with the dust of the earth! The works remain, while the workers are swept away. The inorganic things in nature, the things of inferior value in the universe, are mostly impervious to the destructive agencies, while to the higher creations are allotted the troubles and contingencies of the transitory organic life. But man suffers many inconveniences short of death, by accident and disease. Let us take for example the case of a broken bone, or as it is called a *fracture.*

Nature, the great Repairer of Injuries.—Let

me once more urge the great fact, that the great repairer of injuries and diseases is Nature, and that the duty of the surgeon or attendant merely consists in assisting Nature in her operations. The assumption of more active functions on his part, leads to what has been appropriately termed meddlesome medicine or surgery. It is especially important to keep this fact in view, in the treatment of fractures. A broken bone is not mended like the leg of a table or chair, but by being placed under favourable conditions for healing, through the operation of certain vital processes to be presently explained.

Different ways in which Fractures may occur.—A bone may be broken by violence, such as a blow or fall, acting directly on the part, or it may be broken by the strain produced by a blow or fall directed to some other part. In the latter way the collar bone is frequently broken, by falls on the palm of the hand, when the arm is extended, the force impinging on the palm, and being communicated along the bones of the arm, to the collar bone. Again, a bone may give way at the point where two opposing forces collide, as when the leg is broken in jumping from a height; the resistance offered by the ground being one force and the weight of the body the other, the seat of fracture representing the point of collision. A curious kind of fracture occasionally takes place in the

cranium, by what is called *contre coup* or counter stroke, where the vault of the cranium being struck, the fracture occurs in the base of the skull. The leg is often severely broken in the attempt to jump off a carriage in rapid motion. The velocity with which the leg strikes the ground is equal to the speed of the carriage, and consequently the injury is severe even though the height of the fall may not be great.

Bones are also fractured under the strain of muscular action. The arm bone may be broken by a person suddenly throwing out his arms to seize something that is falling, and the collar bone has been known to fracture in a rider, in the act of giving his horse a back-handed blow. The knee cap is often broken by the strain of muscular action, as when a person makes a violent effort to recover himself when falling backward. Bones are also said to fracture spontaneously, when by extreme old age and other conditions favouring the diminution of organic matter, they become brittle and easily broken. A case is related of a patient who broke his thigh bone with an audible snap, while attempting to get out of bed.

The Bones most liable to be broken.—The bones most liable to fracture are those of the leg and of the arm, the collar bone or clavicle, and the ribs, and any person with ordinary intelligence might soon learn to recognise these

injuries and render suitable assistance, either where a surgeon is not procurable, or temporarily, until skilled assistance should be forthcoming. Occasionally, however, a case may present unusual difficulty, as when fracture takes place in the immediate vicinity of a joint, or when it is complicated with dislocation. The great majority of cases however are simple fractures, and are easily recognised and treated.

How to recognise Fractures.—There are certain signs and symptoms by which an ordinary fracture may always be known. There is usually some deformity or departure from the natural appearance, due to displacement of the broken fragments. Another sign is preternatural mobility. The broken arm hangs powerless by the side, and is freely moveable to the hand of the surgeon or other attendant, though voluntary movements on the part of the patient are greatly restricted and attended with considerable pain. Lastly, we have the sign of the grating together of the rugged ends of the broken bone, called *crepitus*. If this can once be distinctly heard, it is conclusive evidence of the presence of fracture. The way to elicit crepitus is, to fix with one hand the upper fragment, just above the supposed fracture, and seizing the lower with the other hand, to perform rotatory movement against the upper fragment, as if the lower fragment

were a boring instrument, and the upper fragment the material to be bored. I use the simile to illustrate the method, and not for the purpose of suggesting inhuman violence. I hold gentleness and the careful avoidance of inflicting unnecessary pain to be the sacred duty of the surgeon. While endeavouring to elicit crepitus, the ear should be kept closely applied to the part, though the experienced surgeon depends as much on his tactile sense, *tactus eruditus* as he calls it, as on the sense of hearing, for detecting this important sign.

Nature's and Man's part in the Cure of Fractures.—In considering the treatment of fracture, we must ask ourselves the three following questions. What part does Nature take in repairing the injury? What are the forces which oppose her? and in what way can Art best assist Nature?

Nature's first care is to get the broken ends together. If they are lying far apart, her functions are of little avail. She will pour out the cementing medium in vain, and the adjusting of the parts is beyond the sphere of her operations. Artificial assistance is here obviously required, and the *setting* of the bone therefore comes lawfully under the jurisdiction of the surgeon. Assuming, however, that there is no displacement, Nature pours out large quantities of lymph around the part and in the

cavity of the bone. The irritation produced by the injury gives rise to inflammation in the bone and surrounding tissues, and lymph is the product of that inflammation. This lymph which is first liquid, becomes denser and denser, until it acquires the consistency of putty or moist clay, and by the development of bony cells, it becomes still harder, encircling the bone and holding the broken ends firmly within its clasp. The lymph in the cavity of the bone also hardens and forms a plug, by which the two ends are securely held together. Having made the necessary preparatory arrangements and secured herself from interruption, so to speak, Nature proceeds to cement the bones together. This is partially accomplished in about three weeks. In three weeks more the bone is practically recovered, though complete and perfect union cannot be said to have taken place until ten or twelve months have passed. It is advisable therefore to shield it carefully from strains and injuries until this period has elapsed.

When the bone is completely recovered, there being no further use for the *callus*, as the masses of indurated lymph are called, it is gradually absorbed. The callus serves exactly the same purpose as splints. It is fusiform in shape, with the thickest portion round the site of the fracture, and the ends tapering away. A re-

markable provision of Nature in connection with the secretion of callus may here be mentioned. In children, the callus is observed to be excessive, obviously in view of the greater difficulty in their case of maintaining broken bones at rest. But as Nature makes no special departures nor exceptions, except in obedience to recognised laws, this is explained by the greater capacity for nutrition in children. In irritable and restless persons also, a greater amount of callus is deposited by the irritation of the disturbed parts. The very conditions demanding a certain remedy are turned to account in causing its production. The supply of callus is, therefore, automatically regulated.

What are the forces that oppose Nature? There is first the opposition offered by muscular contraction, which drags the broken ends asunder, or draws them one above the other, causing them to ride or overlap. Nature has also to cope with the voluntary movements of the patient, especially if he be irritable and restless. Lastly, there are the constitutional causes arising from organic disease or general debility. Occasionally, also, a portion of muscle or other tissue will be caught between the broken surfaces, and baffle Nature's utmost efforts at repair.

The treatment of fracture consists in obviating these difficulties. With this view, our first

care is to see that every muscle likely to offer opposition is fully relaxed. This is attained by attitude or position. For instance, in fracture of the leg, the knee should be slightly bent or flexed, to relax the large powerful muscles of the back of the thigh; and in fracture of the thigh, the body should be slightly raised to procure flexion of the hip joint and relaxation of the muscles stretching between the hip and thigh. In fractures of the upper extremity, we produce muscular relaxation by placing the arm in a sling.

If there be any displacement, this must be rectified by employing traction, until the fragments are brought into apposition. The bone having been *set*, as it is called, it must be maintained in position by mechanical appliances. Splints and bandages are the usual contrivances used for this purpose. In using splints, care must be taken to pad them well with cotton, wool, or tow, or they will gall and irritate the skin and lead to undesirable complications. Bandages are even more dangerous things in unwary hands. They should never be too firmly applied. In bandaging a limb, the pressure should be gradually relaxed from below upwards. Inattention to these points will soon declare itself at the cost of the patient, by obstructed circulation, swelling, pain, discolouration, and even mortification of the limb. The

fracture being "put up" in splint and bandage, it must not be supposed that nothing more requires to be done to it, in the course of the treatment. During the first few days, the patient is invariably restless and irritable, and the bandages may have to be repeatedly removed, either to adjust the splints or to inspect the condition of the swollen parts beneath. Fortunately the bone does not begin to unite until the ninth or tenth day, and little or no harm is done by disturbing the parts during the early part of the treatment. When ten days have elapsed and the fracture may be assumed to be healing, both the irritability of the patient and the liability to swelling have usually disappeared, and then the appliances must not be disturbed until the bone is sufficiently recovered to dispense with them.

It is a good principle to set a fracture as soon as possible after the accident. It is certainly more conducive to the patient's comfort, and it lessens the liability to subsequent swelling. The misfortune, however, is, that we do not usually have the opportunity of treating fractures until some time after the accident, when the parts have stiffened in their unnatural position and the tissues are swollen.

The patient's general health must be carefully attended to, particular attention being paid to the excretory organs to see that their functions

are duly and regularly performed. Fresh air, cleanliness, cheerfulness, suitable diet, and a due amount of sleep, are as important in their way, as splints and bandages.

Importance of Gentleness in Moving and Carrying Patients. — Great care should be exercised in removing patients who are the subjects of fracture, as the ends of the broken bone are often very sharp, and the jolting of a vehicle or any awkwardness on the part of the bearers, may cause these formidable spikes to inflict serious internal injury, or even to penetrate the skin. The writer knew the case of a little boy who fell over some rocks at the seaside, while bird-nesting, and broke his thigh. As he was being carried home in the arms of the man who found him, the upper end of the bone protruded through the skin. A simple accident, which would have healed kindly in a few weeks, was thus converted into a grave injury, which it took the little fellow, spite of his heroic spirit and excellent constitution, more than a twelvemonth to recover from, the exposed bone having necrosed. The air, charged as it is with germs of putrefaction, is inimical to wounds. The stretcher is the best means of conveyance, but the jolting of a carriage should be avoided.

Instability of the Human Organism.—A story is told of a hypochondriacal old woman, who

was seized with the delusion that she had been transformed into a china teapot, and went about in great dread of being broken to pieces. If we could only see into the elementary depths of our existence, and watch the protoplasmic phases of our life, how those ephemeral cells, the component molecules of our body, crowd into existence, fulfil their brief functions, and disappear ; how little a cause could affect the peaceful routine of their lives, developing discord and disease, how many dangers they daily escape, how sadly they fare under the malign influences of organic existence, if we could see all this, we should greatly covet the stability of the china teapot. The human fabric is built up of elementary cells, laid one above the other, like bricks in a building. Each variety of tissue presents its own peculiar arrangement of cells, and the cells themselves differ in different structures. Every tiny speck of brain matter, every muscular fibre, every splinter of bone, every square inch of cuticle, can count its component cells by the million. But these cells, unlike the bricks of a building, are not stationary. The changes to which they are subject are very numerous. First, there are the changes incident to life, which consists of a perpetual round of decay and renewal. Then there are the changes incident to growth, where the renewal is in excess of the death or decay. Lastly, there is the

order of changes which represents the various departures from the healthy or normal atomic arrangement. The power that binds together these atoms and groups of atoms, is life. The evil influence which disturbs their normal arrangement is disease, or some departure from health. The fell power by which the molecules are rent asunder, and the fabric destroyed, is death. The words of Solomon, "All are of the dust, and all turn to dust again," are a profound chemico-physiological fact. The organic structures derive nutrition from inorganic compounds, and when they have fulfilled their allotted period of life, the earth claims again her own.

Can we ever fully realize the disturbing influence of disease in the human system. Let us take one single disease, and compare our slender knowledge on the subject with the infinite expanse of our ignorance. Where was the first link forged in the lengthening chain of disturbances, and who shall trace it, link by link, to its final goal? We loftily say perhaps that the malady was hereditary, and plume ourselves on our acumen; but how science becomes dwarfed, as we review, in imagination, the complicate connections and ramifications, the order and sequence of events, and the number and variety of influences in the history of disease, which it is powerless to fathom. The list of known diseases, though a long one, does not include

all the troubles to which we are subject. It is only definite revelations of atomic disturbances that enjoy the name of disease. It is only in imagination that we can realize, and that feebly, the interminable departures from the strict standard of health too vague for nomenclature. Such a mutable organization also is ours, that even a high standard of health may, from slight causes, and in a comparatively short space of time, fall away and dwindle.

Fracture of the Bones of the Forearm.—Let us suppose that we have before us a case of fracture of both bones of the forearm. Two features of the injury will be at once noticeable. The patient is evidently in pain, and he is supporting the injured limb with the hand belonging to the other side. Pain and loss of power are therefore the most prominent symptoms. If you request him to perform the acts of pronation and supination with the broken arm, you will perceive that he utterly fails in the attempt. If you run your finger firmly along the sharp edge of the *ulna*—which is the lower of the two bones in the usual position of the arm when it is carried in a sling—from the point of the elbow forwards in the direction of the wrist, you will perceive the finger dipping unnaturally when it arrives at the seat of fracture, the patient simultaneously wincing as he feels the injured spot being pressed upon. These are two important

coincident points of evidence. To ascertain whether the companion bone, the *radius*, is broken, the head of this bone must be felt for just outside the elbow joint, where it revolves in its pivot, and one or two fingers placed firmly on it. The fingers belonging to the injured limb are now seized with the operator's other hand, as in the act of handshaking, and rotatory movements are communicated to the suspected bone by twisting the patient's hand from side to side. If the bone be broken its head remains perfectly motionless underneath the operator's fingers, showing that continuity is interrupted. If this experiment were repeated on the sound limb, the contrast would soon be evident by the rolling of the circular head of the radius, distinctly perceptible to the fingers. Lastly, we endeavour to elicit *crepitus* according to the directions already given.

Mode of Setting a Fracture of the Forearm.—The presence of fracture being clearly proved, we proceed to get the appliances ready, ordering the patient, if suffering from shock or exhaustion, some mild stimulant, such as weak brandy and water, or a teaspoonful of salvolatile in a wine-glass of water. Two splints will be required, one slightly longer than the other. Stiff cardboard or thin deal board splints would answer the purpose. These must be carefully padded with tow or cotton wool, tow being pre-

ferable, if at hand. Ladies I find can always pad a splint well, even without any previous instruction. I will also venture the opinion, that in all the minor details of surgery, ladies prove themselves apt pupils with quick apprehension and dexterous manipulation. The padding in this case is important, not only for comfort, but for preventing the bones from falling together. The space between the bones must be kept clear by the pressure of the padding, as otherwise when the fracture has healed, it will be found that the free movements of the arm are lost. The splints are now to be applied, the fragments having been previously placed in apposition by the employment of traction, the shorter splint to the outside, reaching from the elbow to the wrist, and the longer one to the inner side, from the elbow to the tips of the fingers, being retained in position by the *buckle* bandage. The entire fore-arm and hand, from the elbow to the tips of the fingers, must be supported in a sling, the arm being carried in a position midway between pronation and supination with the thumb uppermost. The ordinary roller bandage is objectionable, owing to the heat and irritation it creates. It is also inconvenient for frequent inspection of the parts during the early part of the treatment. Before the eighth or tenth day, however, everything should be arranged to let the parts rest without further

interference. In about four weeks time the arm may be taken out of the splint, and being well sponged and dried, it must be lightly put up again. On first removing the splint, the arm. though perfectly united, will feel quite helpless and stiff, and in some sensitive patients the sudden loss of the accustomed support may cause faintness or sickness. It is generally advisable to continue the use of the splints and sling at intervals, gradually dispensing with them as the arm gains strength. Some stiffness of the joints is usually left behind, which, however, disappears in course of time, with the help of frictions with warm oil, and the employment of passive motion, while the joints are immersed in warm water.

Fracture of the bones of the leg and thigh is treated on the same principles, though the appliances are slightly different.

Fracture of the Collar Bone.—In fracture of the collar bone, the nature of the displacement is threefold, viz., downwards, forwards, and inwards; and though a great variety of appliances have been contrived for the treatment of this fracture, the principles aimed at in each are identical. The displacement being downwards, forwards, and inwards, the indications of treatment are to retain the bone in a position antagonistic to the displacement, viz., upwards, backwards, and outwards. The displacement

downwards, that is, hanging down or drooping of the shoulder, is counteracted by the use of a sling. The displacement forwards is prevented by what is called a figure of eight bandage with the crossings at the back, while the inward displacement is rectified by placing a wedge-shaped pad, base upwards, in the arm pit for a fulcrum, using the long bone of the upper arm as a lever to push out the outer end of the collar bone, and fixing the arm in this position to the body by a broad roller.

Fracture of the Ribs.—Fracture of the ribs is a common accident. It may be caused by direct violence or by the application of force to the chest. It is easily detected by passing the finger over the suspected part, or by applying the ear to it while the patient is directed to cough or take a deep inspiration, when, if fracture exist, crepitus will be heard. The treatment consists in applying a broad roller or strips of adhesive plaster round the body, to limit the movements of the thorax in breathing and thus afford rest to the broken rib. The injury is a simple one. There is no displacement of the fragments on account of the muscular web between the ribs, and recovery takes place in four or five weeks. But occasionally, when the fracture is the result of great force applied directly to the seat of fracture, several ribs are broken at one time, and the fragments are

driven in with such violence, that they penetrate the lungs, causing spitting of blood and infiltration of air into the surrounding cellular tissue. Such cases are justly considered serious, on account of the danger to the function of respiration which they create. The lung being wounded, air escapes at each act of respiration into the cellular tissue beneath the skin, and gives the patient the curious appearance of being blown up. The great distension of the tissues causes injurious pressure on the lungs, and must be relieved by making several punctures with the lancet, when the air will escape with a hissing noise. The air not only permeates the tissues beneath the skin, but often the substance of the lung itself, but not however the cells. Difficulty of breathing supervenes, indicated by lividity of the face, expanding nostrils and cold extremities. Such a case is extremely serious, and the surgeon can do little more than keep the patient at rest, endeavour to limit the movements of the thorax, and trust to Nature to seal up the ruptured air cells with lymph.

Fractures of the Skull.—Fractures of the skull derive their importance and interest from its proximity to the brain, and from the serious injuries to which the latter is liable, by the occurrence of this accident. The result of a fracture in the vault of the skull is often not

perceptible. There is no displacement, and in many cases no other inconvenience is experienced than the injury to the scalp. The patient may recover even without the detection of fracture. But it is very different if the table of the skull has been driven in, and the fragment is pressing on the brain, or when the brain is subjected to pressure by blood or matter, the products of inflammation consequent on the injury. Under these circumstances the patient lies in an unconscious condition, as if he were the subject of apoplexy. When a portion of the broken skull is causing compression of the brain, it is a matter of great difficulty to elevate the fragment and relieve the pressure. For this purpose surgeons resort to the operation of *trephining*, which those who witness it for the first time may appropriately designate cranial carpentry. The operation consists in boring a hole through a sound portion of the skull in the neighbourhood of the fracture, and introducing, through the opening thus made, an instrument called the elevator, by which the fragment is raised to a level with the rest of the cranium. The effect is marvellous. The patient who had been lying comatose, bereft of motion and sensation, becomes quickly conscious of relief and recovers his senses. A remarkable instance is recorded by Sir Astley Cooper, of a sailor who suffered fracture with depression of the skull,

through a fall from the yardarm on board one of his majesty's ships in the Mediterranean, early in the revolutionary war. As he was quite unconscious and unfit for duty, the vessel making Gibraltar shortly afterwards, he was landed and deposited in an hospital there. He remained there some months, and being still insensible, he was brought from Gibraltar to Deptford, where he was seen by the surgeons there, lying on his back, deprived of all powers of mind, volition, or sensation; but his fingers were moving to and fro to the motion of his heart. If he wanted food, he had the power of moving his lips and tongue, and this action of his mouth was the signal to his attendant for supplying his wants. He was subsequently removed to St Thomas's Hospital. Mr Clive, one of the surgeons, proposed *trephining*, and more than thirteen months after the accident, during the whole of which time he had been comatose, the operation was performed and the depressed portion successfully elevated. The peculiar motion of the fingers immediately ceased, and four hours afterwards he was sitting up in bed and answering by signs the questions that had been put to him, and four days from that time he was able to get out of bed and began to converse. For thirteen months his mind was a perfect blank, and, as Sir Astley Cooper remarks, he had drunk as it were the cup of Lethe.

CHAPTER IX.

LADY DOCTORS AND NURSES.

ARE women eligible for the medical profession? This is not perhaps one of the burning questions of the day; but it is a *vexata quæstio* nevertheless, and one which nobody seems to attempt seriously to answer. Is the idea of a female faculty too quixotic to entertain with any degree of gravity? Is it a joke to admit the notion of a doctor in petticoats, otherwise than as a sample of the nonconformity which one occasionally meets with? Of whom shall we ask? Who are thus entitled to answer? Shall we ask the male section of the public, whether the traditionally grave and sombre figure of the family doctor shall be replaced by the airy form of a woman; whether he would prefer to the severe scrutiny of the former, the soft pensive eyes of some bewitching daughter of Mithridates; whether for feeling his pulse, the taper finger points of some jewelled hand, under which his radial artery throbs too foolishly, is preferable to the plain but learned digit of the sterner sex; whether when the dread

moment has arrived and the cold knife gleams, he will elect the jewelled but quaking hand, or the impassive thews and sinews of the male surgeon to cut off his arm or leg; whether in the hour of dire necessity, the beautiful eyes, the slim waist, and the low voice are calculated to inspire confidence, like the calm strength of the unadorned sex; whether in the gravest emergency, his soul would hunger for imperturbable skill, or for emotion and hysterics? Shall we appeal to the female public, whether they would not prefer one of their own sex for a medical attendant? I wonder whether the fashionable medical visit with its customary attendant pleasantries, would be a more agreeable episode of the day, if the attendant were a woman! I wonder whether there would be any danger of such scorching looks as I often see one well dressed woman throwing to another; I wonder if with some contempt and malice and all uncharitableness, there would be a supreme veiling of the whole with the superb gauze of polite hypocrisy. Again, would not the female public welcome the lady doctor, to pour into her womanly and sympathetic ears the tortuous history of her extraordinary complaint, with a great deal of extraneous matter in parentheses, which it delights some women to inflict on meek and willing listeners, and which a superfine delicacy forbids her to impart

ab ovo usque ad mala, to a male attendant? Would the British parent have anything to say, if, by flinging open the portals of the profession to ladies, there would be such an influx of fair candidates, as to make serious blanks in English hearths and homes, whose greatest adornment are the daughters? What would the young men say, if the objects of their devotion were allured into the rugged paths of Science, wearing learned spectacles on their classical noses, and furtively carrying stethoscopes in their muffs, with formidable amputating knives dangling at their chatelaines? How they would sigh to see the bright complexion fading gradually away in the learned atmosphere of the laboratory, and the pretty dimples merging slowly into furrows, by the pale cast of thought; With what feeling would they watch the insidious evaporation of misty sentiment before the rising sun of knowledge, or the absorbed preoccupied air, characteristic of the learned and the thoughtful, while they are pouring delightful nothings in the maiden's ear! What again would be the feelings of the male doctor, as he daily stumbles on his professional sister, at consultations, at medical dinners, meetings, and clubs.

A minor field, however, is open to ladies, in which they are capable of shining with the greatest lustre; in which so far from losing any

of their native feminine graces, they acquire greater beauty. This is, the field of nursing. All the qualities of character necessary to make a perfect nurse are to be found in a woman of fine culture. The gentleness, the quick sympathy, the kindness, the tact, the firmness, are all eminent characteristics of our gentlewomen, and it is something that England might be proud of, that these tenderly nurtured women have unselfishly come forward as volunteers in the Red Cross service. As an example of those fine traits of character, I may relate a little incident which occurred not very long ago. As I was toiling up a certain hill one burning day in summer, I observed a tramp who had been trudging along on the opposite side of the road, suddenly fall down in a fit, and hastened across to his rescue. A carriage and pair which had just then been passing, suddenly drew up, and the occupants, several fashionably dressed ladies, sprang out to render assistance. One young lady more devoted than the rest, knelt down on the dusty pavement, supporting the struggling vandal's head in her arms, and calmly receiving on the folds of her costly dress, the cold water with which the excited bystanders were freely regaling his unkempt cranium.

Every woman is called upon at some period or other of her life, to act in the capacity of nurse. A parent, a child, a husband, a sister or

brother is taken ill, and the duty of ministering to the sick one almost invariably falls on the female relative. The unselfish devotion so often displayed on these occasions, is, I fear, too little known and appreciated. The weary nights of vigil, the long days of close confinement in the sick room, the petulance of the patient, the cares of the household and the anguish of stifled grief, are recorded only in the great dark circles round the eyes of the gentle heroine of the sick room. Men will stamp and fume at the veriest trifle. A woman will sit trying to smile, while the vultures are gnawing her heart.

It is important, therefore, that women should learn to do rationally and scientifically what they are so often called upon to perform. It is not a little harm that is done by ignorance on the part of those who minister to the sick. For instance, to those who do not understand the *rationalé* of fainting, it must be a mere guess whether the patient should be laid in the recumbent position or placed in the sitting posture. The wrong method is just as likely to be adopted as the right, the patient is propped up, the last drop of blood gravitates away from the brain, and deeper grows the faint. Supposing again that a patient is brought under notice, cold and collapsed from loss of blood. An ignorant nurse thinks the best remedy is brandy

and plenty of blankets. The result is, that under the stimulating influence of alcohol and heat, the heart beats with renewed vigour, and the staunched vessels break out and bleed afresh. Another common practice among ignorant nurses is to force solid food on patients suffering from acute diseases. The loathing of food so frequently observed in these cases is the safeguard which Nature employs to protect the stomach from the ingestion of solid matter, and which is totally inadmissible under the circumstances. But the violation of Nature is the quintessence of meddlesome and witless nursing. Another burden is thus laid on the hapless patient struggling with his malady, fever is added to fever, matters grow worse, and yet the innocent perpetrators wonder at the result.

CHAPTER X.

DISLOCATION OF JOINTS.

AMATEURS will rarely be called upon to treat a dislocation, and I should advise them not to make the attempt without some previous knowledge of the subject, and not even then, unless the case is one of urgent necessity. It is however useful to be able to recognize the injury when one sees it, and to understand the methods and principles of treatment.

Description of the Shoulder Joint.—Let us in the first place make a critical examination of the parts concerned in a dislocation. Let us take the shoulder joint as an illustration, as it is the one most liable to the accident. The head of the humerus and its containing socket in the scapula are covered with cartilage, a smooth, white, india-rubber like substance, by which the jarring effects of concussion are prevented. The whole joint is then enveloped in a bag or capsule, which is attached at one end to the circular edge of the socket, and at the other to the neck of the bone just below the head. The capsule is lined with a membrane, called the

synovial membrane, which secretes an oily fluid for lubricating the joint. The apparatus is strengthened by tough fibrous bands, called ligaments, passing to and fro over the joint, and the bones are also kept in their place by the continuous tension of the powerful muscles passing from the shoulder and the chest to the humerus. Atmospheric pressure also plays an important part in maintaining the spherical head within its socket, as may be proved by the immense force often required to pull it away after every connecting fibre has been severed. It will be seen, therefore, that the parts have been planned and executed by nature with due regard to strength, and that the frequent occurrence of dislocation cannot be attributed to deficiency in that respect. The powerful muscles of the shoulder are very useful in preventing dislocation. In a patient in whom these muscles had become weakened by disease, dislocation of the shoulder joint occurred upwards of forty times. It often occurs that when dislocation takes place, the muscles have been taken by surprise, as it were, in a moment of relaxation. On the other hand, muscular contraction occasionally induces dislocation.

The Perils of Kissing.—A very amusing incident occurred in my experience some years ago, when I was assistant to a practitioner in Scotland. As I was sitting one evening in the

consulting room, two persons were shown in, a young man, leading by the hand a girl of most remarkable appearance. Her jaws were wide apart, the lower jaw being an inch or so in advance of the upper. It appears that while laughing at her companion's repeated ineffectual attempts to kiss her, the coquette's jaw became suddenly fixed, had dislocated in fact, by muscular contraction during the act of laughing. By inserting a cork on either side of the jaw between the teeth, and using it as a fulcrum, the bone was soon replaced in its proper position, and the pair went on their way rejoicing, and meditating, no doubt, on the serio-comic perils of kissing.

When dislocation takes place, the cartilage is very often injured, the capsule is torn, the ligaments stretched and damaged, and the head of the bone ploughs its way through the neighbouring muscles, vessels, nerves, and other tissues, bruising, tearing, or otherwise damaging them. Some inflammation and swelling, therefore, always follow the injury, and if the head of the bone rests in the axilla or arm pit, as it usually does, the pressure on the nerves and blood-vessels, of which there are a great many in this situation, causes numbness in the fingers, and coldness of the limb from obstructed circulation. If, however, the dislocation be speedily and skilfully reduced, these symptoms soon dis-

appear, and the injury to the joint is effectually repaired.

The nature of the injury is unmistakable, by the peculiar flattening of the shoulder, and the presence of the head of the bone in its abnormal position. The great distinguishing feature of dislocation is rigidity of the limb, as contrasted with preternatural mobility, which is the characteristic feature of fracture.

Causes of Dislocation.—Dislocation may be caused by the application of direct violence to the part, but more often it is the result of indirect violence. The shoulder, for example, is usually displaced by falls on the hand while the arm is extended, the latter being also, as will be remembered, the usual way that fracture of the collar bone takes place. The occurrence of one or other of the injuries will depend to some extent on the comparative strength of the shoulder joint and the clavicle. If the joint resist the violence, the strain is thrown on the clavicle, and if the latter refuse to give way, the force rebounds on the shoulder.

Reduction of Dislocations.—With regard to the treatment of dislocations, we must bear in mind that the great opposition we encounter in endeavouring to replace the bone in its socket, is offered by the muscles. The same force which they exerted before the accident, in maintaining the bone in its place, is now exerted to its fullest

extent in preventing its replacement or *reduction.* In former times surgeons never thought of anything but force to overcome force, and the formidable pulleys and ropes which they used for this purpose, and the terrible amount of force which they resorted to, are horrible to contemplate. It is on record that an arm was, in one instance, actually torn away from its attachments by the desperate and fearful attempts to reduce a dislocation. Pulleys and ropes are not yet abolished from surgery, but they are now resorted to only after every other attempt has failed, and certainly not with the same recklessness which characterized their use in former times.

Muscular contraction is now effectually overcome by the use of chloroform. When a patient is under the effects of chloroform or æther, the nervous influence which maintains the tonicity of the muscles is withdrawn, and they become flaccid and feeble, offering no opposition whatever to the manipulation of the bone. If, after the patient is brought fully under the influence of the anæsthetic, there is still some difficulty in reduction, we may be certain that there is some other cause than muscular contraction to account for it. The head of the bone may be entangled in some of the tissues, or the operator may have bungled in the direction in which he employed traction.

A simple Method of reducing Dislocations.—Surgeons are also in the practice of reducing dislocations without the aid, either of force or chloroform, by a method which may be considered the utmost refinement of operative surgery. The method consists of a series of movements by which the muscles are dexterously disarmed and put off their guard, and the bone neatly slipped into its place by craft, with comparatively little pain or inconvenience to the patient. This is effected in shoulder dislocation by laying the patient on his back, with the injured shoulder fixed by an assistant, and raising the arm perpendicularly by the side of the patient's head. The head of the bone is thus brought directly upwards into its socket, and the muscles being at the same time relaxed by this movement, the head slips in with a snap. In dislocation of the thigh, the method of manipulation on this principle is summed up in three short directions, *lift up*, *bend out*, *roll out*, suggested by a well-known professor for helping the memory of his students. This method of treatment, however, is only successful in the hands of a master of the manipulative art.

Reduction comparatively easy, if attempted soon after the Accident.—When dislocation has taken place, the surgeon should be sent for with the least possible delay, as every minute lost only

adds to the difficulty of reduction. If a patient be seen immediately after the accident, a very moderate amount of extension and counter extension will suffice to bring the head of the bone to the edge of the socket, when a slight push with the thumb on the head of the bone will complete the operation, reduction taking place with a sudden jerk or snap. But as time elapses, the muscles begin to shorten, carrying the displaced bone further and further away from its empty socket, and frequently inducing powerful spasmodic action of the muscles, which the patient is unable to control.

What happens if Dislocation be left unreduced.—If months are allowed to pass without any attempt at reduction, Nature makes up her mind to do what she can independently of artificial aid. She proceeds to fill up the old cavity, it being no longer required, and to make a new socket where the head of the bone is lying. A false joint is thus formed with imperfect movements.

After reduction, the injured limb should be fixed in splints and bandage, and allowed to rest for three or four weeks, until the parts have recovered. If kept at rest longer than this, however, the joint may become stiff from adhesions.

Dislocation of the Thumb very difficult to reduce.—One of the most difficult dislocations

to reduce is that of the thumb. Small and insignificant as this joint appears to be, it offers enormous opposition to reduction, which is frequently insurmountable. The difficulty is said to lie in the head of the bone becoming caught in a slit between two ligaments, like a stud in a button-hole, rendering reduction impossible without previous division of the ligaments. Dislocation of the patella or knee-cap is also a troublesome injury, its reduction being often attended with considerable difficulty. Dislocation of the ankle is of frequent occurrence, and it is always accompanied by fracture of one or other of the bony promontories which guard the sides of the joint.

CHAPTER XI.

THE ETHICS OF TEMPERANCE.

THE veteran philosopher, St Paul, observes in his first epistle to the Corinthians, that "every man that striveth for the mastery, is temperate in all things." If we knew nothing more of St Paul than that he was the author of this single observation, it alone would entitle him to rank among the first thinkers the world ever produced. Whether we consider the subject of temperance in its bearings on physical life, in its moral or spiritual aspects, or as an abstract ethical question, the observation of St Paul is equally a verity; and none but a profound thinker, and one who had, as Carlyle says, "that sincerity which is the first characteristic of all men in any way heroic," could have given birth to a proposition so pregnant of truth and meaning.

How this master mind must have grappled with the dim undefined forms of truth, flickering and flashing at intervals in the gloom—the gloom of a prescientific age—giving glimpses, and glimpses only, of the vision it was panting,

and fretting, and yearning to realize! The facts and phenomena of life, the isolated fragments of some unknown but existent whole, seemingly confused in their relations — the physical verging on the moral, the moral overlapping the spiritual—could not present themselves to such a mind without awakening earnest thought, patient endeavours to trace effect to cause, and a determination to realize that coveted goal of philosophers, the deeply-buried treasure of mind workers—Truth.

If we examine the characters of men who have gained any great ascendency over their fellow-creatures, or who enjoy any degree of wide popularity, we shall find that one feature invariably distinguishes them, viz., moderation of character. Those who lack this virtue are not likely persons to sway their fellow men. Wherever we turn in life, this truth always encounters us, that sacrifice is essential to the well-being of society, and sacrifice is only a form of temperance, for without the spirit of temperance there can be no sacrifice. Without sacrifice a man cannot be truly happy. If he aspire to gain any mastery over himself or his fellow creatures, he must be prepared to make sacrifice to a very large extent. Every one knows that the surest way of destroying our influence over others, is to adopt an antagonistic attitude towards them, and that a certain

amount of concession is necessary in every case to maintain authority and control. The wise man carefully studies the metaphysics of human nature, and schools himself to avoid wounding the vanities, the infirmities, and the prejudices of the crowd through which he moves, and, like a prudent porcupine, he goes about with quills recumbent, in the attitude of conciliation. How those offensive weapons must chafe at times, to break the moral pinions that bind them supine, and bristle in native fury. But these wayward instincts must be controlled, and this is temperance, moderation, prudence, self-denial, or call it what you will. They are one and all the offspring of the same parent spirit or principle. It is a healthy exercise. Physically and morally it is healthy. We are always better and stronger for such acts of self-restraint. It is a mastery over one's self, and he who would command others must first learn to command himself. Wherever this noble principle comes into operation in any individual character; wherever sacrifice, moderation, and the kindred virtues are successfully practised, there is the dawn of a new happiness, the era of a new power, in the goodwill and esteem of his fellow creatures, and a consciousness that he is making for the mastery for which he strives.

Again, if we gaze on a beautiful face, which may be said to exercise a species of mastery or

influence over us by forcing or commanding our admiration, and endeavour to analyze the component parts or features, we shall notice at least one fact, viz., that not one of them is exaggerated. A too prominent nose or chin, for instance, would have been fatal to the harmony of beauty. Or if we follow with our eyes the graceful movements of some living form, we shall find that here too the ideal is obtained by the avoidance of extremes. Exaggerated movements would be clownish, and tend to excite ridicule. Similarly the ideal of life is attainable only through temperance in all things; and health, strength, happiness, and longevity are not to be looked for without a due observance of this fundamental law of life—temperance.

Intemperance in Eating.—Life consists of a perpetual round of decay and renewal. The waste of the body is replaced by new material drawn from the blood, which in its turn is replenished by the food we eat. That we may not neglect the important duty of furnishing new material, Nature has implanted in us a sensation of imperious necessity, called hunger, the gratification of which is a source of considerable pleasure. Man makes it his business to stimulate the appetite with every conceivable device of art, so as to increase the pleasure attached to its gratification; and as a result of his diligence and industry in this direction, we

have the recondite morsels set forth in the fashionable menu card of the present day, which sneers at the mutton chop as the food of the robust vulgar, while pandering to its votaries with "larks in cases," and *Pâté de foie gras.* O degenerate fancy that could eat those beloved warblers of the spring, and feed on the livers of geese plagued to death by plethora! The wants of the system are the natural regulators of the appetite, and when the latter fails, it is generally an indication of impaired power of the system to assimilate food. For example, in fevers and most acute diseases, the power of digesting and assimilating food is very limited, only bland and liquid nourishment being tolerated, and consequently the appetite is diminished. The sensation of hunger, though referred by us to the stomach, is not entirely located there. The great source from which it is derived is the blood, which, as it is being used up and requires replenishing by food, gives rise to hunger. That the stomach is not the seat of hunger, may be proved in two ways. If the blood be replenished by injecting nourishment into a vein, hunger is appeased as effectually as if food were taken into the stomach in the ordinary way. Again, if the pneumogastric nerves, which are the chief channels of communication, by which the brain is made cognizant of the state of the stomach, were divided, it will

be found that the sense of hunger is in no way affected. With these facts before us, we are enabled to appreciate the suicidal folly of unnaturally forcing the appetite. And yet this is the practice of civilized people, who, with the aid of sauces, pickles, and various condiments, flog and spur the appetite, and even resort to alcoholic stimulants, in order that they may eat more than they require, for the sake of the gratification attached to the indulgence. The consequence is what the most elementary student of physiology and chemistry could safely predict. The mass of food lies decomposing in the stomach, evolving gases, and disturbing the circulation and nervous system. The victim sinks into an arm chair after his luxurious repast, dull and oppressed, and falls asleep, waking up after a short interval, the most dejected and miserable creature imaginable. Headache, indigestion, depression of spirits, and utter incapacity for work are among the immediate results of intemperate eating; and habitual excess cannot fail ultimately to lead to organic disease, especially of the stomach and liver.

It is impossible to lay down rules as to the quantity of food necessary for the due maintenance of health, as there are so many modifying causes to be taken into consideration. The most reliable method, however, of forming

an approximate estimate is to calculate the probable amount of waste in each case, and regulate the supply proportionately. Growing youths, for instance, require more food than full-grown people, and persons who take active exercise more than those who lead indolent and sedentary lives. In cold weather also, there being greater oxidation of tissue for the maintenance of animal heat in low temperatures, a greater amount of food is required. Suckling mothers, and patients suffering from chronic discharges, also require a liberal diet to compensate for the loss they sustain.

Alcoholic Stimulants.—What is that property of alcohol, which makes it such a universal favourite among mankind, which possesses such attractions for human beings in every quarter of the globe, that almost every nation extracts it for its use out of some product of the earth? We have the *arrack* of the Indians, obtained from the cocoanut palm, we have the *raki* of the Greeks and Turks, a spirit distilled from rice, the *samshoo* of the Chinese, the *sacie* of the Japanese, the *kawa* of the Pacific Islanders, the *pulque* of the Mexicans, the *chica* of the South Americans, the *koumiss* of the Tartars, obtained from mares' milk, the *vodki* of the Russians and Poles, and the *tallah* of the Abyssinians, while there is the long list of alcoholic beverages in use among ourselves and

the other nations of Europe. Not only is it in universal use, but thousands and hundreds of thousands become slaves to its power, so great is the fascination which it exerts. Most of us who have a little acquaintance with alcoholic stimulants will understand the kind of seductive power it exercises over irresolute humanity ; but let me explain the physiological action of alcohol, and show its effect on heart and brain, which produce the agreeable sensations, which, I fear, we all know and love too well—though not wisely.

The primary effect exerts itself on the heart and blood vessels. The heart beats more rapidly, more blood is sent through the vessels ; and as a consequence, activity prevails in every part of the organism. An agreeable sensation of warmth and comfort pervades the body, ideas flow more rapidly, and the mind is cheerful and contented. But this is only half the effect of alcohol. The other half is expended on the brain and nervous system. The nature of its action on these organs, is similar to that of a narcotic, stupefying, blunting or paralysing their functions, according to the degree to which the narcotic is pushed. All our troubles—our mental miseries and our physical pains—are dependent for their acuteness and for their perception, on the integrity and sensitiveness of the brain. Extinguish the brain, and you may pierce a man in every part of his body

with knives, or heap woes and cares on him, with impunity. Alcohol, by blunting the nervous system, and depriving us of the power of feeling, banishes, or at any rate mitigates, pain and misery for the time being.

That there is an attraction, and a strong one, in alcohol, is therefore not to be denied, and the fact must not be lost sight of by those who would advocate temperance. To ignore the fact is to ignore the chief obstacle we have to contend with in attempting to suppress the abuse of stimulants. If we would successfully do away with alcohol, we must find some good substitute. Those who are labouring to abolish the use of alcoholic stimulants by preaching and denunciation — and all honour to their heroic efforts — are fighting against tremendous odds. There is first and foremost the acquired taste, strengthened and perfected by transmission from generation to generation. There are the customs and usages of every grade of society, the enormous manufacture and sale of intoxicating liquors, and the numerous temples of Bacchus, from the glittering palaces dazzling with gas and crystal and glowing wine, to the common wayside tavern. If some of the zeal and energy of our temperance reformers could be expended in discovering some suitable substitute for alcohol, some ethereal compound, which would produce the exhilaration without the

sting in its tail, which makes alcohol the demon it is, from which the brain could recover with a bound, like an indiarubber ball after it has been squeezed, without injury or damage; if this ideal elixir could be realized, the greatest stumbling block to the cause of Temperance would be removed. In the converts won to the cause by the sword of intimidation, there is too often a pent up fire, a secret longing and hankering after the images of Bacchus, which now and then blazes out and bursts into flame, in spite of ribbons and pledges. It is more rational and humane to humour the craving with some substitute, and in the worst cases of the kind, especially in females, it is the only method which holds out any hope of success.

Alcohol as a Medicine.—I now proceed to consider the properties which make alcohol such a useful medicine in sickness. It is a well-known fact in physiology, that it is essential for the nutrition of any part of the body, that the nerves supplying that part should be in a healthy condition. If the nerves supplying a limb, for instance, were diseased or morbidly irritable, the limb would waste, or show other signs of imperfect nutrition. The ankle has been known to mortify twenty-four hours after an injury to the spine. In another case where a man had sustained a severe injury to the spine by an accident, the lower half of the body became

paralysed. It was also found that the man had had a leg and an arm broken by the same accident. Both the fractures were skilfully set, and both received the same careful attention. But although the arm quickly recovered, the fracture of the leg which came within the influence of the injured nerves, never united. Neuralgia of the head very frequently renders the nerves so morbidly irritable, that the nutrition of the hair is interfered with, and it turns grey. In old age, the nerves gradually degenerate by natural decay, and we have the grey hair and the wasted and wrinkled condition of the body common to this period of life.

In some excitable conditions of the nervous system the effect on nutrition is just as certain, though not so disastrous, as when the nerves are actually diseased. Thus lunatics, idiots, and persons with morbidly constituted nervous systems, are generally ill-nourished and lean. For the same reason, we usually find that intellectual and precocious children are inclined to slimness, while the perfection of nutrition is exemplified in the rotundity of those stolid and prosaic little ones, whom we so often meet among the peasantry.

But in no instance does nervous aberration threaten the safety of the body so gravely as in the advanced stages of many diseases, particularly fevers. The medical profession are

still in ignorance as to the real nature of fever, but, whatever it may be, the manner in which the nervous system becomes affected in severe fevers is remarkable. So great is the depression, the morbid irritability and the sensitiveness of the nervous element, that nutrition is absolutely impossible under the circumstances. It is as if a severe war were raging in the heart of a country, rendering peaceful commerce impossible. This is the crisis when alcohol is called for, when it exerts its valuable properties to greatest advantage, and when it produces its effects in a manner that no other remedial agent can rival, fulfilling all the requirements of the condition quickly, completely, and satisfactorily. By blunting the awful sensitiveness of brain and nerve, it enables the patient to assimilate the food he takes, the process of nutrition proceeds apace, and death is averted; and there is perhaps no single medicine in the pharmacopeia capable of exercising so much benefit as brandy, under these circumstances. The two great indicators in fever which call for the use of stimulants are the state of the tongue and pulse. When the tongue becomes dry and brown, and when the pulse is soft and compressible, intermittent or imperceptible, and if along with these conditions, the patient shows signs of great prostration, such as tremulousness and twitching of the limbs, and low muttering

delirium, one thing, and one thing only, can save him, if he be savable, and that is alcohol. There are some, I know, who hold contrary views, who assert that every emergency in sickness can be met without the aid of alcoholic stimulants. These would insist that beef tea and other concentrated nourishment would be preferable in such an extremity. Nothing more idle nor more thoughtless could be advanced. As well push a boat to a semi-conscious and exhausted drowning man and bid him row ashore. Before food could be digested and assimilated, if digestion and assimilation were even possible under such circumstances, the patient would be lost. But alcohol produces its effects instantaneously, and promptly drags the drowning patient as it were out of the water, leaving the more tardy ministers, food, medicines, and good nursing, to complete the rescue after he is brought ashore. Alcohol will not only snatch a patient from the very jaws of death, but when directed by skilful hands, will intervene powerfully to prevent him drifting into danger. Stimulants are also useful by their tonic effect on the heart and blood vessels. In the condition known as faintness, the heart is nearly always in feeble action, and brandy is therefore a useful and rational remedy in such cases. But we must be very careful to distinguish ordinary fainting

from apoplectic or epileptic conditions, in which the administration of alcoholic stimulants might be attended with the gravest results. In cases where the circulation is very languid, as after immersion, or great exposure to cold, the administration of a small dose of brandy or other spirit will immediately restore the activity of the circulation. The following are a few additional indications for the use of stimulants in sickness:—When there is copious perspiration without any attendant improvement in the general symptoms, when blood poisoning is present, when bed sores begin to form, showing great depression of vitality, when the patient is a person of intemperate habits, or of advanced years, and when the extremities are cold. Stimulants must be avoided when the urine is scanty, when severe darting headache or acute delirium is present.

Alcohol as a Beverage.—I next proceed to consider the use of stimulants as a daily beverage. I fear that all we can say in favour of alcoholic liquors as beverages is, that it is an agreeable addition to meals. It is a fact repeatedly proved, that our mental faculties and our physical powers are capable of their best efforts without the aid of stimulants.

With regard to the question whether the moderate use of stimulants is injurious, much will depend on what is taken as the standard

of moderation. The limit of safety for a strong healthy man is said to be one ounce of absolute alcohol in twenty-four hours, which is equivalent to a wineglass of whisky or brandy, a pint of strong ale, or three glasses of good sherry. When a larger quantity than this is taken, alcohol can be detected in the urine, which is a sign that the limit of safety has been reached. If, however, this be the limit for strong healthy men, it is evident that for weaker people and women, the *physiological* quantity, as Sir Andrew Clarke calls it, must be considerably less. Much also depends on the form in which alcohol is taken. There is considerable difference in risk between, for instance, tossing off glass after glass of raw spirits, as the gamekeepers and ghillies do in the North of Scotland,—a feat which an astonished Saxon tourist described as a torch-light procession down the throat,—and taking spirits well diluted in water, or taking alcohol in the form of light wines.

Among the Northerners, who, it is feared, are too partial to the bite of concentrated spirits, dilution of the fiery substance is contemptibly termed "drowning the miller." A good story is told of an eminent Scotch clergyman, who was partial to his *toddy*. While indulging in his favourite beverage at a public dinner, he was confronted by a zealous abstainer, who fixing his eyes on his reverence, pointed to

the well-filled tumbler by his side, and severely remarked, "Are you aware sir, that there is death in that glass?" "I believe you are quite right," replied the other, "there *is* death in that glass, for I have 'drowned the miller.' Be good enough to pass the whisky, and I will soon bring back the good man to life."

A good deal also depends on the time at which stimulants are taken. Taken on an empty stomach, it inflicts local injury on this organ, damaging the glands and vitiating the gastric secretion. Stimulants are best taken during meals, and they should never be indulged in before the mid-day meal.

In order to avoid all risk, a good plan is to abandon the continuous use of stimulants and to observe intermittent periods of abstinence. The system is thus given an opportunity of recovering from any ill effects it may have suffered, and the danger of falling into intemperate habits is also lessened by adopting this method.

One remarkable property of alcohol I must not omit to mention. It lessens the elimination of carbonic acid and nitrogen. In other words, it diminishes the waste of the system, and makes food go a longer way. It banks up the fire of life, and so economises coal. It is owing to this property of alcohol that we often see obesity in people who indulge freely in stimu-

lants. The waste being prevented, the superfluous food is converted into fat. This, however, is not a desirable state of matters. The ideal of health consists in active waste and active renewal. The checking of waste and the formation of fat is a condition which may be compared to the rusting of machinery from want of use. Alcohol has been termed the genius of degeneration, and the fattening brought on by intemperance may be looked upon as an incipient stage of certain degenerative changes in the system, that can end only in disaster, and which may be accepted, therefore, as a warning signal of danger.

CHAPTER XII.

WORK AND RELAXATION.

NEVER in the history of the civilized world has there been such a display of eager, red-hot, rushing competition as impels the fast travelling human machine of to-day. From the tiny school boy on whose brain, according to high medical authority, modern education is inflicting fatal injuries, to the rueful tenant of the dingy counting house, the crowd is pressing forward, elbowing and jostling one another, each on his goal intent. Professional men, tradesmen, artizans, labourers, literati, are all touched with the same electric stimulus, and are all dashing along, heedless of everything but the coveted prize, heedless of the yawning abysses into which they occasionally fall headlong in their blind impetuosity; heedless of the serpent that lies coiled in their path; heedless of the tender beings whom they rudely push away, or trample upon in their precipitate course. A horse will go quietly along a country road, responding sluggishly to the whip or to his master's urging voice, until he hears the sound of

another horse's hoofs behind, or catches a side-long glimpse of a rival form straining to pass him; when suddenly he erects his head and ears, dilates his nostrils, and displays an amount of voluntary energy and speed, which no amount of whipping could induce. This is exactly the case with us. We are under the influence of one of the most powerful inducers of action. In competition, we see one of the greatest motor powers in the world of progress. Every man and woman employed in any worthy pursuit is running a race. Each individual's pace is quickened as he hears the stamping of feet behind and beside him, and catches glimpses of the eager excited faces at his right and left, while the warm breath of hotly pursuing rivals drives him to desperate emulation. Some of these are running for dear life, driven by competition almost to the verge of starvation. Some are making for Fame's proud temple shining afar, others for the gilded bauble of wealth. Many of these are unsuccessful, wanting ability or health; some reach their destination just in time to die exhausted with their efforts, and others discover on arriving, that the reality or fruition is not equal to the anticipation, and that distance lent a mock enchantment to the view. Comparatively few realize their rosy-coloured dreams, and attain happiness with possession. This is an age of progress, and there can be no

progress without competition. Without competition the spirit of emulation would languish and die. What is the meaning of medals and clasps, of ribbons and decorations and prizes? Are they not a recognition of the enormous power which competition exerts in advancing knowledge and virtue and skill? Would it be irreverent to ask, whether the promise of life eternal, and the stimulating examples of fellow Christians, are not powerful incentives to virtue, and whether there is not something akin to competition in thus provoking one another to good works?

What is the result of all this keen competition on our mental and physical organization? The world advances. Science probes deeper and deeper into the mysteries of Nature, and year by year her seals of secrecy are broken and her occult operations revealed to the world. Science on her part guides Art in the construction of mechanical contrivances, and teaches her to conduct her operations on correct principles. Science has annihilated distance and bridged the boundless ocean. In the trackless waste of waters, the mariner pursues his course with confidence and precision. Who guides him? It is Science. At a steam manufactory there is a giant force imprisoned, hissing and chafing to be free. All around are wheels and belts and various other appurtenances of machinery, de-

riving active motion from that captive force. The great motive power is broken up and distributed. At last it arrives softened, moderated, and refined, to the performance of some exquisite work, marvellous in its precision, delicacy, and neatness. There are few commodities of life now which do not owe something to the labour-saving agency of steam, and who gave us this benefactor? It is Science.

Competition wrings out all a man's abilities and capacities; but how do the brain and body fare under this extraordinary pressure? They simply break down, and then there is a cry for rest and relaxation.

Work, a Natural and Healthy Function of Mind and Body.—It must be remembered, however, that work and not repose is the normal function of the brain and body—that man is capable of undergoing, not only with impunity, but with positive benefit, a far greater amount of work than is commonly supposed, and that when ill-health follows severe work, it is generally due to certain more or less avoidable conditions, with which it is complicated. It is a familiar fact of animal physiology, that living structures are healthier and stronger and better developed, when their functions are regularly exercised or called into action, and that disuse causes them to become feeble and to degenerate. The blacksmith's arms are powerful and mus-

cular, because he constantly exercises them in severe labour. Circulation through the arm is promoted, nutrition proceeds more rapidly, and the various muscles acquire increased development and strength. A tailor's arm, on the contrary, is ill-developed, and his muscles weak and flabby, because the nature of his effeminate calling does not entail vigorous exercise of the muscles. Paralyzed limbs are constantly observed to diminish in size through the want of exercise imposed by paralysis, while on the other hand, the heart acquires increased development when the valves are constricted by disease, and greater labour is thereby thrown upon the organ to overcome the difficulty. Similarly, the brain acquires vigour and development from habitual exercise of its functions, and suffers deterioration by disuse. Who has not experienced the healthy, almost buoyant, sensations which follow a good day's work, sensations which often assert themselves in spite of physical fatigue; and who has not experienced the awful tortures of a vacant mind, a mind that has been allowed, for want of occupation, to feed on itself! A grass field will not sooner be choked with rank weeds and brambles if left uncultivated, than the mind will run wild for want of culture. Let the civilized man test this. Let him go into some awful solitude where he can only converse with the echo of

his voice, where the only sympathy he could find would be in the sad rolling of the sea waves or the moan of the wind in the hollow caves, where the sea-bird's cry would mock his solitude, and the elfish light of some wild beast's eye would glare at him through the gloom. Let him live here for a couple of years banished from the world. Let him now come back to it and observe if he has not slid a pace or two behind his fellows; whether the glib tongue has not rusted, whether the ideas have not become somewhat confined, whether mental acuteness is not blunted and mental capacity contracted.

I repeat, therefore, that work is the normal function of the body and mind, and that under favourable conditions, we are able to undergo an enormous amount of work, not only without injury, but with absolute benefit to mind and body. Inaction or want of employment is perhaps a greater source of harm than excessive work. I will now proceed to enumerate the accompanying or complicating conditions, by which work is handicapped and made to produce such disastrous results.

The Evil Effects of pursuing Distasteful Callings.—Chief among those conditions is repugnance to the particular kind of work in which we are engaged. Have we not often observed, that after taking a walk or perusing a book

under a sense of duty, and directly against our inclinations, the sensation of fatigue is painfully prominent and out of all proportion to the exertion. On the contrary, when we are engaged on an interesting book, how many hours we can spend in absolute enjoyment and never know fatigue; and how the hours speed, how the miles are covered without flagging, when we walk with an agreeable companion. Two men sit at a counter. One is thoroughly at home. His work and his surroundings are perfectly congenial, and therefore a pleasure to him. The other endeavours to fix his attention on his irksome work, but his mind is oscillating between it and some other favourite pursuit, to which, though beaten back, it fondly and eagerly returns. The two men wend their way homewards in the evening, the former with an elastic step and a buoyant spirit, the latter discontented, heavy and dejected. At the end of a year, they go for their holiday, the one merely to shake off the dust and cobwebs of office, the other with shattered brain and nerves, seriously seeking health.

We thus see how important a matter it is to select a profession or trade in which we can work with agreeable feelings, and which is consonant in some measure to our tastes. If two things move together in the same direction, there is no friction, and consequently no wear

and tear; but the moment they begin to run counter to each other, the grinding and grating and rasping, which are so trying to the nerves, take place, and the machinery soon wears out. Parents commit a grave error, when they attempt to carry out some secretly cherished wish to see their sons pursuing some particular profession or calling, in manifest opposition to their predilections. It is not merely that they are likely to fail in life, by having a profession foreign to their tastes and capacities thrust on them, but there is the danger to health from the addition of distastefulness to work, which makes hard work doubly hard to bear.

Wearing Effects of Work in Persons who are Incompetent for their Calling.—Another important condition is incompetence. What a dreadful position it must be for a person to realise every day of the year, that he was never intended by Nature or Education to fill the post he occupies! What a drudgery the work of a lawyer must be, who is convinced of his incompetency! How helpless must the doctor feel, who realises that his patients' confidence is misplaced! How fatigued he must feel at the end of the day with the horrid task of guessing at puzzles, floundering at treatment, certain of nothing, and every day dreading detection! A person always feels more fatigue when he attempts anything in which he is not a proficient.

The clumsy rider, oarsman, or swimmer always feels his exertions more acutely than he who is an expert at these pastimes. How differently must the practised writer bear his literary labours from the neophyte who cudgels his brains.

Influence of Temper in determining the Effects of Hard Work.—Another important element to be considered in estimating the wear and tear incident to work, is temper. Some men and women are either gifted by Nature, or have been successful in cultivating such a fine even temper, that they roll through life with the least possible friction, a pleasure to themselves and to those with whom they come in contact. There are others who seem to bristle with barbs and angularities, which catch at everything and everybody, creating irritation, discord and acerbity. When a person brings into his work or business a temper such as this, the bad effects of severe exertion must be doubled. You will generally notice bad-tempered persons bearing traces of their failing in their features, and every organ in their bodies would probably bear similar testimony, if it could be seen and read like the face. A fit of bad temper upsets digestion, gives a headache, produces depression of spirits, and other evils. When therefore such a bad influence is conjoined to the wearing effects of hard work, the result may be easily imagined.

Our Bad Habits are frequently responsible for a large share of the Evils attributed to Hard Work.—Some of us have also our habits to blame for a large share of what is usually attributed to severe application to business. The mid-day meal, which, it must be apparent to all rational people, is an important one to men engaged all day in laborious duties, is often ignored, and the appetite of the individual reserved for the late dinner, which is a luxury that comes after work, as if eating for the purpose of fitting oneself for work, were a less important matter than eating for the sake of the sensual pleasure it brings. If again we habitually resort to alcoholic stimulants as a remedy for fatigue and weariness, and to support us in the trying hours of business, we shall be laying up for ourselves a good deal of extra punishment when the day of reckoning arrives. When a person is engaged in severe mental labour, he should not resort to violent physical exercise for relaxation, as the combined effects of brain exhaustion and muscular fatigue weigh heavier on the constitution than the former alone. You will often see men with hazy ideas of the physiology of relaxation, resorting to an immoderately long walk, or some other violent exercise, by way of counteracting the depressing effects of brain work. The usual consequence is, that physical prostration is added to mental

depression, and instead of being refreshed, they only feel nerveless and exhausted. There is nothing more suitable for brain-workers than the relaxation to be found in cheerful society. Physical exercise must be prescribed in extreme moderation, and more as an inducement to get the fresh air than for the sake of the muscular exercise it affords. Severe brain work and violent bodily labour are utterly incompatible. No man is endowed with sc much nervous power as to spare enough for both. The busy brain-worker has barely enough nerve power to nourish the modest demands of his sedentary body. When, however, by violent physical exercise, there is increased consumption of tissue, and the body makes larger demands of nervous energy, the brain becomes bankrupt and the body starves, as may be observed in the worn, ill-nourished appearance, which often characterises those who affect the combined character of athlete and philomoth.

Young People's Minds should not be Overtaxed. —In children and young people, the brain and the body are both growing, and the bulk of their nervous power is required for nutrition. When their minds are too severely taxed, nutrition is interfered with, development is arrested, and the way is paved for disease and decay.

When one's work is monotonous, when work is pursued under disagreeable compulsion, or

when grief or anxiety accompanies it, its pressure on the system is more pronounced, the necessity for relaxation is more urgent and the injury more permanent.

With regard to relaxation, the chief thing is to choose it with judgment, consulting one's taste, constitution and temper, rather than the usages of custom. How many go to the seaside, who would far better enjoy, and derive greater benefit from, some quiet country residence, and how many drag themselves to the keen mountain air of Scotland, who would have fared better under the benign influence of ocean zephyrs. Brown, guided by vanity, takes a walking tour for which he is totally unfit, and returns home not much revived after his holiday. Smith is tramping the heathery moors, uneasily carrying a breeechloader, while his heart is away in the swirling pool splashing with the salmon's leap, and he finds the fashionable sport an irksome business. In order that relaxation may best serve its purpose, it must be spontaneous and, as Ruskin remarks, it must be "something that we do to please ourselves, and only for the sake of the pleasure, not for an ultimate object."

CHAPTER XII.

RABIES AND HYDROPHOBIA.

THE distinction between rabies and hydrophobia is not generally understood. Rabies is a species of madness that originates spontaneously only in the canine family, such as the dog, wolf, fox, hyæna, and jackal, though it is freely communicable, by inoculation, to other animals, and members of its own family.

The term hydrophobia is, strictly speaking, limited to the disease which manifests itself in man, when he is inoculated with the virus of rabies. Hydrophobia would be a misnomer if applied to the affection in dogs, as they do not, in any stage of the disease, show signs of antipathy to water, though popular notions erroneously ascribe this feature to them. The peculiar behaviour of rabid dogs justifies the application of the term rabies to the disease as developed in them. *Hydrophobia*, however, is an appropriate name for the human phase of the malady, as the dread of water is a prominent feature of it. The sight, or even sound, of water is enough to induce spasm of the muscles

about the throat, through the association of water in the mind of the patient, with the painful difficulty of swallowing. In dogs, however, there is no such embarrassment. They are tormented with thirst throughout the disease, and lap up water freely at every opportunity.

The Registrar-General's returns up to the 12th December 1885 bring up the deaths from hydrophobia during the year, in London, to twenty-five, the average annual number in the ten years, 1875-85, being six. More than four times the number of fatal cases, therefore, have been recorded this year, as compared with the average of the last ten years. This fact may be soothing to the outraged owners of dogs, who have been compelled to submit their favourites to the unsightly muzzle, or to the indignity of being led, or dragged *nolens volens* through the streets. They complain that there is not even the excuse of the dog days to justify such an annoying and cruel restriction. It seems certainly hard that Rover's greetings with Carlo should be frigidly conducted through a double barrier of cold wire, and that poor Miss Smith's pet poodle, on whom she lavishes the whole wealth of her maiden affection, and who objects to muzzle or string, should be dragged by its devoted mistress, like an inanimate toy, through the mire of public thoroughfares. The muzzle must have been a strange experience at first to

the metropolitan dog. One great retriever was observed bounding away towards a particular spot in a hoarding, with the evident intention of smelling it, according to his instinct; but, as he dipped his nose, the protruding muzzle struck the boards, and gave him such a scare, that he tore away in a perfect frenzy of terror.

They can, however, become perfectly reconciled to it, as the following incident will prove. A dog, who was extremely partial to a run with the carriage, was ordered to be muzzled preparatory to being taken out for his favourite exercise; but the muzzle not being properly secured, it dropped off before Rover got out at the door. The sagacious dog, however, soon appeared, bearing the muzzle gingerly between his teeth, and having deposited it in the hands of his master, who was waiting for him at the gate, he patiently held up his head to have it fastened.

Heat has apparently nothing to do with causing rabies. It has been shown, by statistics, that in the hottest seasons of the hottest years, there have been comparatively fewer cases of rabies. In Australia, where the heat is often intense, in the burning climates of Central Africa and Egypt, in the West Indian Islands, and in many other tropical countries, rabies is unknown. Dogs are, however, liable to brain affections, especially epilepsy, which, it is

possible, have been occasionally mistaken for rabies.

When it originates *de novo*, the victim is generally some ownerless, stray, mongrel cur, who wanders about uncared for, lean and hungry, feeding on stray food, scraps, and offal. The introduction of rabies into a district may nearly always be traced to the appearance of some such animal, suffering from physical depression and nervous irritability, which experience has proved to be the fit conditions for breeding contagious disease. Rabies does not usually originate spontaneously in well-cared-for dogs, but is communicated to them by inoculation through the bite of a rabid animal.

It is very important that the symptoms of rabies should be recognised by all, especially owners of dogs, in order that early steps may be taken to destroy rabid animals, and prevent further contagion. Dr Burdon Sanderson, for some time professor superintendent of the Brown Institute, and Dr Fleming, the principal veterinary surgeon to the Army, have each, independently of the other, suggested that the leading symptoms should be printed on the back of the dog licenses; but unfortunately some permanent official in the Inland Revenue Department, it is surmised, opposed this innovation.

Symptoms of Rabies.—The earliest symptoms

of rabies is a strange alteration in the dog's manner and habits. His natural cheerfulness and alacrity forsake him, and he becomes sullen, quiet and morose. Close observation at this stage will also show that the eyes assume a vacant, sleepy expression. Purposeless acts, such as scraping the earth, scratching the floor, and worrying carpets and shoes, are engaged in, not in a spirit of playful mischief, but with a comical gravity and earnestness of manner. When food is offered, it is taken and strewn about, or carefully buried in several places, but never eaten. The eyes are occasionally directed to the floor or air, as if intently following the movements of some imaginary insect, this being suddenly followed by a snap at the illusory object. Tired as it were of its fruitless exertions, it will retire after a while into a corner, and crouch in an attitude of fear mingled with fierceness.

An important and characteristic feature of rabies, is the flow of tenacious saliva from the dog's mouth. Occasionally it uses its paws to free its mouth of the substance, and this symptom, coupled with a gaping mouth from paralysis of the lower jaw, leads the unwary observer to think the dog is choking with a bone, and on attempting to relieve him, to be bitten.

The vcice of the dog also undergoes a change,

becoming hoarse and croupy. It is heard in the dead of night as a weird sound, between a bark and a howl. As the disease advances the head swells, the eyes are bloodshot, and paroxysms of fury alternating with intervals of exhaustion prevail, under which he gradually sinks.

A notable feature in rabies, and one which is not observable in any other nervous affection of dogs is, that even in the wildest frenzy, the animal recognizes the voice of his master, and appears to enjoy a brief period of sanity on hearing it.

Another characteristic feature is the perversion of the appetite. Turning away from the food offered to it, it will attempt to eat stones, earth, hair and other unnatural substances within its reach.

A rabid dog may almost always be recognised by its gait. On account of partial paralysis of the hind legs, it cannot walk steadily, but ambles along, the head carried low, the jaw hanging down, and the tongue protruding from the side of the mouth, dribbling with saliva. In this way the animal goes along, rarely turning from his path to attack any one, but snapping at everything that impedes his onward course. He only stops when overtaken by exhaustion or the supervention of a fit, when he creeps away and hides himself, lying for hours in a semi-comatose condition.

A modification of the disease, called *Dumb Rabies*, is recognised, the leading features of which are, absence of voice and a dropping of the jaw from paralysis of its muscles, the latter being often the first symptom which is observed.

M. Defays, a professor at the Brussels Veterinary School, gives a touching instance of maternal affection clinging, even in the frenzy of madness, to a female dog, who was suckling a litter of puppies. After each paroxysm of fury, it returned to its offspring, tending them with the greatest solicitude. As she refused all food, however, the secretion of milk was arrested, and the puppies died. But the mother still continued to fondle them, and to cover them over with straw, as if to hide them, and it was only when complete paralysis had supervened, that she ceased to occupy herself with her dead offspring.

A pathetic case is related of a litter of puppies which, being suckled by a rabid mother, had imbibed the venom with the milk, and all gone mad. The foam is described as having hung in flakes about their mouths, and their poor little heads were twitching just as the mother's had done.

On the other hand it is on record that a child drank the warm milk drawn from a rabid cow, and no ill effects followed.

Period of Incubation.—The question is often asked, what length of time must elapse before a

person bitten by a suspicious dog can be considered absolutely safe from hydrophobia? The average time is from four to twelve weeks, but in two authenticated cases, the malady did not reveal itself till after fifteen and twenty-six months respectively. This tardiness in the development of the poison is a most unfortunate feature of hydrophobia, as it keeps bitten persons in terrible and prolonged suspense, and produces a state of nervous depression, very unfavourable for resisting the virus. It is at least conceivable, from our experience of wounds in general, that the depressing effects of prolonged anxiety and fear, would considerably lessen the chances of escape from active absorption of the poison.

People bitten by a suspicious dog very often clamour for the slaughter of the animal which bit them, and are comforted when it is killed. I cannot conceive anything more irrational, as the issue of the bite depends on the sanity or otherwise of the dog, and to kill it is to wilfully destroy the only means of reassuring the patient if the wound is innocent, and of realising the gravity of the case, if the dog were discovered to be mad. To flatter one's self with a sense of security by the immolation of the offending animal, savours of superstition and childish credulity.

A person bitten by a rabid dog soon recovers

from the wound, and has time to forget the occurrence, before strange sensations of itching and burning about the scar, bring back the horrid incident to his mind, and with it the train of fears and misgivings which previously haunted him. Difficulty in swallowing is experienced at first in a scarcely perceptible degree, and afterwards with all the horrors of violent convulsions. When fluid is offered, the patient endeavours at first to swallow it in convulsive gulps, and as the disease advances, the sight or even sound of water brings on spasms of the muscles of the throat. Excessive sensibility is characteristic of hydrophobia, the patient starting at the least sound, and even the rustling of the bedclothes, or a current of cold air would bring on a fit of convulsions. The patient is also in extreme mental agitation and terror. The popular notion that hydrophobic patients bark and bite like dogs is an error. The so-called bark is merely the gasping breathing, and the attempt to bite is the movements of the tongue and mouth, induced by the sticky saliva. Death takes place usually from exhaustion, and consciousness is retained almost to the last.

Treatment of Bites of Rabid Animals.—With regard to the treatment of mad dog bites, the routine practice is that of cauterising the wound as soon as possible after the injury. For hydrophobia itself there is no cure. Once the terrible

spasms have set in, the doom of the patient is sealed. The practice of cauterising is adopted with the view of preventing the absorption of the virus, and is obviously founded on the supposition, that instantaneous absorption does not take place. If the virus has receded even a couple of inches from the wound into the circulation, cauterising is manifestly of no value whatever as a preventive measure.

In snake bites, we find absorption of the venom taking place very rapidly, as often within a very few hours the victim is dead. What grounds have we for supposing that the poison of snakes is absorbed differently from that of rabies? It is true that the period of incubation is more prolonged in rabies poisoning; but it is hardly conceivable, and it is contrary to physiological facts, that this is due to deferred or sluggish absorption. What takes place during the period of inoculation, no one knows. It is possible that the virus remains latent in the blood or nervous centres, waiting certain unknown conditions for its fatal development. Cauterising, therefore, unless resorted to immediately after the injury, must be considered at best a precarious prophylactic.

If we have hitherto deplored the long stage of incubation in hydrophobia, we are soon likely to have the strongest reasons for rejoicing in it, in view of Louis Pasteur's brilliant discovery of

inoculation as a preventive of hydrophobia. It takes ten days or so to perform the series of graduated inoculations, which is to render the patient proof against the virus of rabies, according to Pasteur's method; and how thankful we ought to feel for the days of gracious incubation, which allow time for the leisurely performance of such a benign operation. Had the virus of rabies been wont to produce rapidly fatal effects, like snake poison, there would be no time for the elaborate and tardy process which Pasteur practises.

Pasteur's Method of Treating Hydrophobia.—Pasteur's discovery, according to his paper recently read before the Académie des Sciences is this:—He finds that the virus of rabies increases in virulence by being passed successively through the bodies of rabbits. He takes a small portion of the spinal cord removed from a rabid dog, and, diluting it, injects it into the brain of a rabbit, which invariably contracts rabies after an average period of fifteen days. But, by inoculating a second rabbit from the first, a third from the second, and so on, until the virus has passed through a succession of twenty-five rabbits, it acquires increased virulence, so that the twenty-fifth rabbit supplies a virus, which is capable, by inoculation, of producing rabies in eight, instead of fifteen days.

He also finds that the portions of cord, re-

moved from rabid animals, if suspended in jars containing potash, gradually lose their virulence in the dried air, and become perfectly inocuous.

In order to render a dog refractory to rabies, M. Pasteur begins by inoculating him with virus, which has been rendered harmless through long exposure to dried air. After a couple of days, a second inoculation is made, with somewhat stronger virus, and so on, until twelve or thirteen inoculations have been made, each one slightly more virulent than its predecessor, the last being made with the strongest virus. The dog, thus treated, is so far exempt from rabies, that direct injection of the virus into his brain fails to communicate the disease. Fifty dogs are said to be thus treated by Pasteur, without a single failure.

The most sensational part, however, is the following:—Joseph Meister, aged nine years, who was bitten in several places by a mad dog, on July 4th, was brought to Pasteur's laboratory from Alsace. A consultation with two other eminent physicians being held, Meister's case was considered hopeless, and therefore warranted the experiment of inoculation being tried on him as a *dernier ressort.* On July 6th, sixty hours after the bite, Meister was inoculated under the skin of the right side, and the inoculations were continued at intervals in gradually increasing virulence, until thirteen were made in a period of ten

days. We understand from the latest reports that Meister is in perfect health.

How little did Jenner think, when he worked out the almost superhumanly ingenious scheme of vaccination, that it would lead to such a glorious conquest as Pasteur has every probability of achieving.

CHAPTER XIV.

ON GOUT.

THERE is no human law which protects us against ourselves. The liberty of the individual is the great feature of all approved forms of government. We may inflict on ourselves any amount of injury short of attempts at suicide, and the laws of our country will not interfere to prevent us, so long as we do not injure our neighbour. It is otherwise with the laws which govern our physical existence. Their operation tends in great measure to save us from our own folly. We cannot violate these laws without incurring the pains and penalties of disobedience. Even an infant, after experiencing a few falls, begins to understand the axioms of natural justice, and the knowledge thus acquired breeds the predominant instinct of self-preservation. It is an unpleasant testimony to our fallen nature, that an appeal to our physical senses, like the application of the rod to a school boy, should have been deemed the most effectual means of compelling us to exercise a proper care over our bodies.

Gout is one of the penalties we have to pay for luxurious living, and we will leave those to judge who have felt its sting, whether the punishment is adequate to the offence, and whether it is severe enough to act as a deterrent.

The typical subject for gout is a man between thirty and forty years of age; a *bon vivant* who generally eats more than is necessary for the requirements of his system, partaking largely of animal food several times a day; who daily indulges in a full allowance of malt liquors or unfermented wines, and is indolently inclined, as regards muscular exercise. If, moreover, he inherits a predisposition to the malady, he may be marked out as fair quarry for the gout fiend.

Symptoms of an Attack of Gout.—Let me describe a typical first attack. Our supposed victim retires to bed, all unconscious of the tortures awaiting him before the dawn of another day, and which is to find him enlisted in the army of martyrs. It may be, he goes to rest feeling uncommonly well, or he may have been troubled a good deal previously with heart burn, or other symptoms of disordered digestion, which, however, he never dreams of associating with the approach of an attack of gout. His slumbers are disturbed some time after midnight by uneasiness in the ball of the great toe, and by general feverish restlessness. The pain

increases, and is described by sufferers as boring, tearing, or piercing. In the morning the part is discovered to be red, swollen, and glazed, and intersected by turgid veins. As the day wears on, some relief is experienced, but on the approach of evening, the torments of the previous night are repeated, which again subside in the morning. If no treatment be adopted, the suffering may be prolonged for several weeks, the swelling gradually becoming doughy and pitting on pressure, while the cuticle over the joint peels off.

Another attack may not come on for two years or longer, if the patient has profited by his first experience and the advice of his physicians. But more often, when a few months have passed, the memory of those sufferings, together with the physician's warnings, is obliterated, and the old habits are resumed. Patients usually feel remarkably well after an attack, the offending material in the blood being expelled by the occurrence of the joint affection; and this lends a false strength to the delusion that they have probably done with gout. Gradually they are enticed to relax the irksome restrictions, until the lurking enemy once more has his victim within his grasp. The attacks become more frequent, and invade other joints than that of the big toe, until at last the patient has scarcely any interval between the

visitations of the foe, and the various joints are stiffened and distorted with the chalky deposit.

The Cause of Gout.—It is only within comparatively recent years that the true cause of gout has been discovered. Previous to Dr Garrod's discovery, the theories of gout have been all of that vague character which marks the prevarications of ignorance. The ancients attributed it, as they attributed almost every other disease, to *the humours*, their favourite shield in ignorance, the meaning of which they probably did not clearly understand themselves. Dr Garrod, the greatest authority on gout, has dissipated all uncertainty on the subject, by proving that the chalky deposit in the joints consists of uric acid, in the form of urate of soda. The blood becomes charged with this substance, and the deposition in the joints, which constitutes an attack, is the effort of Nature to expel the foreign material from the circulation, and is really a conservative process. Even after a first attack, if the affected joint could be examined, small white patches would be seen on the cartilaginous structures, which present, under the microscope, the appearance of fine crystalline needles or prisms. If these be further tested, they will be found to be composed of urate of soda. Other facts, with which we are familiar, have an important bearing on this remarkable discovery, and leave no

doubt whatever as to the correctness of Garrod's theory relating to the origin of gout. For instance, we know that over-feeding, especially in regard of animal food, favours the production of uric acid in the blood, that the use of malt liquors and wines also causes acidity, and that deficient action of the skin from want of exercise produces the same result ; and these are precisely the conditions which favour gout. We also find that the acidity caused by dyspepsia has a similar effect on the blood, and gout and dyspepsia are intimately related to each other. Lastly, we find that the kidneys are frequently diseased in gouty subjects, and it is well known that the use of animal food in excess throws additional burdens on the kidneys, by the increased formation of nitrogenized compounds, especially uric acid, which it is a special function of the kidneys to excrete. We also find that the little nodules so often seen on the ears of gouty subjects, are composed of the ordinary chalky deposit of urate of soda, exactly similar in composition to the substance found in gouty joints.

Why Gout attacks the Big Toe specially.—The reason why the ball of the big toe is selected as the favourite seat of early attacks of gout must be to a certain extent a matter of conjecture. It is fair, however, to infer that the chalky deposit would prefer its home in non-

vascular tissue, that is, structures not rich in blood, such as the cartilage and ligaments of a joint, as the object of the blood being to get rid of the offending matter, it carries it to a part which has the least possible connection with it. For this reason, a part remote from the heart, such as the toe, would be chosen. But why the big toe more than any other toe, and why that particular joint known as the *ball* of the great toe? The other toes are equally non-vascular, and the terminal joint of the great toe is even further removed from the circulatory centre than the ball, and yet the latter is invariably chosen over the others. Dr Garrod attempts to explain this by the comparatively greater amount of strain, which this joint bears in all the ordinary actions of the foot.

Internal Gout.—Occasionally, during an attack of gout, if the patient indiscreetly exposes himself to cold, the local affection is liable to be checked and some internal organ, such as the heart, stomach, or brain, to be affected. *Retrocedent gout* is the name given to this phase of the disorder. Almost every organ is liable to be affected in this way. When the brain suffers, it may give rise to apoplexy, epilepsy, delirium, or even mania. The nerves are often affected, giving rise to severe neuralgia, especially sciatica. The stomach is subject to sudden spasms, giving rise to pain, oppression, and vomiting. The heart

is subject to anginal attacks, producing a train of characteristic symptoms, such as palpitation, constriction of the chest, difficult breathing, a sensation of extreme anxiety and faintness. Bronchitis, with attacks of asthma, is often produced by suppressed gout, and are amenable to treatment, only when remedies appropriate for the gouty condition are used. The bladder, the kidneys, the eye, and ear are frequently the subjects of retrocedent gout. The skin is liable to obstinate and unsightly eruptions. Gouty persons have a special predisposition to gravel and stone in the bladder.

Remedial Treatment of Gout.—The general principles of treatment may be given in a few words. Alkaline remedies to neutralize the acidity of the blood, with colchicum in appropriate cases, gentle saline aperients to stimulate the action of the liver, the due maintenance of the functions of the skin and kidneys by suitable measures, the avoidance of animal food and alcoholic stimulants, absolute rest of mind and body, and some local anodyne application to the inflamed joint. These are the general indications. Further details must be determined according to the merits of the case, and modifications made to meet peculiar circumstances as they arise. As the swelling and pain diminish, solid food must be cautiously and gradually given, especially in persons of full habit, begin-

ning with fish, fowl, or game, before beef or mutton is ventured upon. In the way of stimulants, small quantities of spirits, well diluted in potash water, may be administered; but as the latter is injurious when taken at meal times, from its disturbing effect on the gastric juice, the allowance of stimulants when combined with potash is better taken an hour or two before meals. With the increased freedom in diet, an attempt should be made to take some exercise, care being taken, however, that premature efforts in this direction do not lead to partial relapses, and ultimately tardy recovery.

Preventive Treatment of Gout.—The preventive treatment consists mainly in rigid temperance in eating and drinking, with avoidance of sedentary habits. It requires some thought, and considerable self-control, to convince ourselves that self-denial as regards the pleasures of the table is our bounden duty, and to act bravely up to our convictions. Instead of imposing a check on our appetite, we seek rather to spur it with every conceivable device. The needs of the body are no longer considered, and the act of eating as a means of invigorating the system is treated as an obsolete fashion. To stimulate the appetite by artificial means, and to partake of food and drink until absolute feebleness from satiety supervenes, seems to be the significance attached at the present day to the physiological

function of renovation. We are not carnivora, and we cannot possibly require large quantities of meat. Neither are our kidneys constructed with a view to eliminate large quantities of alcohol. Whether by natural selection they will accommodate themselves in course of time to its baneful influence, we cannot say. If again we do not exercise our muscles and create a waste, what is to become of the new material which we import in such large quantities at each meal? They are justly perverted into poisons to torment and tease the thoughtless offender against Nature's economy.

Gouty persons should avoid "made dishes," highly-spiced food, and sweetmeats. Vegetables are useful on account of the soluble salts they contain. Grapes, oranges, and strawberries are allowable, but apples, pears, plums, and other stone fruit shouid be avoided.

The wines to be carefully avoided are port, sherry, marsala, and madeira. Those which are best adapted to the patient are sound claret, hock, moselle, sauterne, and chablis. The best spirits are whisky and French brandy. All violent exercise and severe mental application must be eschewed, while fresh air and gentle exercise should be regularly taken. The fact of malt liquors and wines producing gout is substantially proved by the immunity from gout enjoyed by the lower classes in Scottish towns,

who drink scarcely any other stimulant than whisky, while among the corresponding classes in England, whose favourite beverage is ale, gout is very prevalent.

The waters most adapted to gouty patients are those of Weisbaden, Aix la Chapelle, Carlsbad, Baden-Baden, Buxton, and Bath.

Connection of Gout with Lead-Poisoning.—Some curious points have been brought out by Dr Garrod in regard to the connection of gout with lead. He was struck with the number of persons among his gout patients who were workers in lead, such as plumbers, painters, &c. This led to investigations, which resulted in showing that lead-poisoning, or even the influence of lead short of poisoning, predisposes to gout.

Dr Garrod has also discovered that gouty people are more susceptible to lead-poisoning than others. For instance, when the drinking-water of a house becomes impregnated with this metal from the cistern or pipes, the gouty members of the family, if there be any such, will often become affected, and show symptoms of lead-poisoning, while the others escape. Lead therefore should not be prescribed in any form or shape to gouty individuals. Dr Garrod mentions the case of a man who had lead prescribed to him for severe bleeding ftom the

nose, and developed gout under the influence of the remedy. The key to these interesting points is found in the fact, that the blood of patients under the influence of lead contains uric acid in excess.

CHAPTER XV.

CURIOSITIES OF GUNSHOT INJURIES.

A GREAT many incidents relating to gunshot injuries are in good truth curiosities. Facts which are familiar to every experienced soldier and military surgeon, appear incredible to those who have no acquaintance with the subject. In many instances, the authenticated records of the battle-field furnish details of gunshot injuries, which appear to violate not only truth, but Nature herself; so much stranger is truth than romance.

Spent Shot.—For example, no person could conceive the amount of injury that may be inflicted by spent shot, who had no previous knowledge of the subject. When a cannon ball, after ceasing to move through the air or along the ground by ricochet, is quietly rolling along with its velocity apparently spent, one would naturally suppose its power of inflicting injury had ceased. Young soldiers are in fact often tempted to pick up a spent gun-shot which they imagine they can stop as easily as a cricket ball at the end of its course. The

attempt to do so, however, invariably results in severe destruction of the hands or legs, necessitating amputation. No matter how slowly a spent ball may be moving, an old soldier is fully alive to the danger of touching or meddling with it. In a case of this kind, reported by Mr Cole as an incident of the siege of Mooltan, the victim, a boy, declared that he thought the shot had actually stopped when he ran to pick it up. He, however, received such serious injury to his thigh, that Mr Cole had to amputate the whole limb from the hip joint.

M. Baudens furnishes another case, which happened in the Crimea. A soldier sleeping on the ground, was struck by a spent gunshot and instantly killed. The ball was found quietly lodged in the hood of the poor fellow's great coat, and it was evident, therefore, that there was little progressive power in it at the time it inflicted the fatal injury.

Gunshot Wounds produce little or no Pain at the Moment of Infliction.—Another characteristic which contravenes our natural ideas of gunshot injuries, is the comparative absence of pain at the moment of infliction. It would be difficult for the imagination to realise anything more horrible than the pain of a bullet traversing one's flesh. The experience of most men, however, who have received gunshot wounds, testify to the remarkable freedom of pain,

which characterises them. In some cases, the sensation experienced is compared to a prick, or the sting of an insect; in others to the smarting produced by a blow from a cane. In a few instances, the injured person is perfectly oblivious of having been struck, though he may be mortally wounded. A soldier, excited by his surroundings, and eagerly engaged in combat, will continue fighting after being struck, unconscious of injury, until he becomes faint and exhausted with loss of blood, or until the trickling of the warm blood directs his attention to the wound.

A private of the 7th Fusiliers was in face of the enemy at Inkerman. A bullet pierced the lower and outer part of his neck, and tore its way out behind through the shoulder blade. No idea of having been shot entered the private's mind. He was not even aware of the wound he had received in front, but his sensations led him to suppose that the officer behind him had pricked him in the back with the point of his sword. He turned round instantly to learn what this was done for, and was in time to see the officer in the act of falling. The bullet which had just passed through his own neck, had struck the officer in the head and killed him. An army surgeon refers, with amusement, to the sudden anger of an officer in front of him, who, on some occasion of effecting

a landing before an enemy, was hit by a bullet through the fleshy part of the thigh, while the party were advancing on the sea-beach. He had no idea at the time that he had been shot, but turned round in a rage, on the supposition that some one had struck him a sharp blow from behind. It is a curious fact that, in most cases, the sensations are referred to the wound of exit. That so little pain should be inflicted by the penetration of a bullet, is scarcely surprising, however, if we consider the extreme velocity of the missile, and the inconceivably small space of time in which it traverses the flesh. The Martini-Henry rifle bullet travels the first 400 yards of its course in one second. Supposing it to pass through six inches of the fleshy part of a man's arm at the same rate, the time occupied in traversing the part would be 1·2,400th part of a second. There is hardly time for the local impressions to be conveyed to the brain, and the latter is therefore imperfectly cognisant of the injury. The reason why the pain is generally referred to the wound of exit, may be explained by the lessened velocity of the bullet, and greater stretching and tearing of the sentient surface at the place of its escape. It is a certain amount of consolation to those whose sympathies are with the poor soldier, that there is even so much mitigation of the sufferings, which we conjure up for

him in the field of battle. The following case, however, if it be the language of sober truth, and not the utterances of a man enthusiastic in the description of his own sufferings, is a horrible exception to the rule. Dr Chalmers Miles, a medical officer, who received a gunshot injury during the Sepoy mutiny, writes :—" Just about this time, I was shot through the thigh by a bitten musket bullet—one of those implements of war which cause immensely unpleasant and jagged wounds. The feeling when you are hit is peculiar ; it is just as if a red-hot iron was suddenly plunged into your thigh, and the channel it formed filled with molten lead ; then a scalding, unpleasant pain passes through you, and then there is a sensation of faintness, yet relief, and the ball is out." This is the only instance I can find of pain having been experienced at the entrance, along the track, and at the exit of a gunshot wound.

Curious Cases connected with the Lodgment of Bullets.—The lodgment of bullets is a subject which furnishes numerous curiosities. Before the introduction of the conical bullets, when spherical balls were in use, the missile was easily deflected from its course by obstacles in the body, such as bones, and tough structures, like tendons, and even the skin. The spherical ball was often found lodged in a part remote from its entrance, after having pursued an extraor-

dinarily tortuous course. Thus a person being hit in the ribs, the ball would travel under the skin, along the ribs, to the opposite side of the body; or the bullet striking the front part of the shoulder, would travel half round the joint, and make its exit at the back, making it appear that the intervening tissues and organs had been pierced, while they were really untouched. The modern conical bullet is a more deadly missile, and instead of being deflected by bones and tough tissue, generally crashes through them, reducing the hardest bone to splinters by its destructive force.

Besides the projectiles themselves, a variety of substances are often found lodged in the track of a bullet wound, derived from the clothes, arms, and accoutrements of the soldier. Thus buttons, bits of leather, fragments of buckles, coins, watch keys, nails from boots, and various other articles, have been abstracted from gunshot wounds. Ravaton relates the case of a gunshot injury in the thigh, the healing of which was protracted for three months after the ball had been extracted, by the presence in the wound of a silver seal with a cornelian stone, which had been shivered into thirteen pieces. A soldier was struck in the thigh by a conical bullet at Mine Run on November 27, 1863. The missile shattered two knives, which were in the man's pocket, and carried the fragments

with itself, also cut in pieces, into the man's thigh. One hundred fragments of the knives and four of the bullet were removed in the field hospital. Not only substances from the wounded man's own person may be found in the bullet track, but occasionally also articles derived from contiguous or surrounding objects. Thus a portion of a man's jaw was once found in a wound of the palate, sustained by a soldier in the Crimea. It had come from a comrade, whose head had been shattered by a round shot while standing by his side in the battery. Among other such cases which occurred during the Crimean war, was one of a double tooth of a comrade being found embedded in the globe of a wounded soldier's eye. There was lately a curious relic in the museum of the Army Medical Department at Netley. It consisted of two five franc pieces, which Dr Hennen extracted from the thigh of a Hanoverian soldier. The interest attaching to this relic consisted in the fact that the coins were carried, not from the man's own pocket, but from that of another soldier, who stood before him in the ranks, and had been hit by the same grape shot. The coins were presented by Dr Hennen to Sir J. M'Grigor, for preservation in the Army Medical Museum, whence it was lately stolen, presumably for the small amount of silver they contained.

As an instance of the curious effects of rota-

tion of bullets, may be mentioned the case of Lieut.-Col. Reed, of the 54th Foot. This officer was the second in command, and while assembling for parade at Trichinopoly, he was on horseback, and carried in his hand a limp rattan cane about the thickness of a little finger. This cane he was moving up and down in front of his face, when a private stepped up and fired his musket at him. The ball, which was a spherical one, struck the cane, and ran up it, splitting it all the way to the point, while the officer escaped.

With regard to the lodgment of projectiles, it will surprise many to learn that not only bullets, but fragments of shells and gun-shot many pounds in weight become embedded in the flesh, lodging for considerable periods of time without so much as their presence being suspected. Dr MacLeod of Glasgow mentions that he saw a case at Scutari, in which a piece of shell weighing 3 lbs. was extracted from the hip of a man wounded at the Alma, which had been overlooked for two months. In the Italian campaign of 1859, General Auger of the artillery was wounded in the shoulder at Solferino; but the lodgment of the gunshot, weighing upwards of 6 lbs., was not discovered until the moment when amputation at the joint was being performed, and the knife came into contact with the metal shot. Mr Guthrie mentions a case which occurred during the Peninsular Wars,

where a ball weighing 8 lbs. lodged in a man's thigh, and was not discovered till many days afterwards, when amputation of the limb was being performed. The following case illustrates the length of time metallic substances may be tolerated in the system, and their presence undetected by the skill of the surgeon or the sensations of the patient. By the bursting of a gun, a farm labourer received an extensive wound over the right eye, which, however, ultimately healed up, and he returned to his work as usual. *Twenty-three years* afterwards, while in bed, he was suddenly seized with a feeling of suffocation, and was conscious at the same time that something had fallen into his throat. He started up, thrust his finger and thumb into his mouth, and pulled out something, which turned out to be the iron breech of a fowling-piece weighing four ounces.

Windage of Shot.—There was a curious idea formerly prevailing among soldiers, that very grave injuries were inflicted by what was known as the *wind of shot;* and consequently one heard extraordinary instances from them of the appalling effects of gunshot, when they brush close to an individual without hitting him. Thus we hear of a ball passing close to the stomach and causing instantaneous death, and of a soldier having the buttons of his trousers carried off by a cannon ball, and suffering

paralysis of the bladder afterwards for three months, in consequence. These cases are gravely reported by Sir Gilbert Blane, as instances of injury from windage or *vent de boulet.* An officer relating his experiences in the Confederate War of Independence, gives the following astounding facts :—" Galloping along I felt a stunning blow across the spine, and at the same moment my horse rolled over with me. A solid shot had passed close to my horse's back, and the current of air set in motion by its passage, had knocked over both horse and rider." On the other hand, Mr Bransby Cooper, when he was assistant surgeon of the Royal Artillery, and on duty near Bayonne, saw a 32-pounder shot pass between the outstretched thighs of an artillery officer as he was in the act of sighting a gun. It caught and carried off the tail of his uniform coat, but did no further injury whatever. Cases are also on record, in which hair has been shaved off the head without further injury. Modern views discredit the theory of "wind contusions," and attribute these cases to actual contact of the ball with the injured part under certain modifications of direction and obliquity, which protect the skin from injury, while internal organs are seriously damaged, and fatal injuries often inflicted. A blow, such as that from a spherical cannon ball, which would be sufficient to crush even bones and

reduce the internal organs to a pulp, will often be resisted by the tough and elastic skin. Private Campbell, of the 42nd Regiment, was killed in the Crimea by a cannon ball, which entered the abdomen. When the body was being raised for burial after action, the shot bulged out in a pouch of the skin of the back. Though the spine was ground to pieces by the force of the blow, the ball, which weighed 24 lbs., was unable to effect its exit, on account of the toughness and elasticity of the skin.

Poisonous Properties formerly attributed to Bullets and Cannon-Shot.—Another curious idea which prevailed among military men in former days, was, that cannon balls and bullets possessed some mysterious poisonous influence, and that therefore every gunshot wound was a poisoned wound, and required to be treated as such. Some said that the poison was derived from the metal of which the projectiles were made. Others conjectured that the virus was developed at the moment of explosion of the charge; while the uncharitable ones accused the enemy of steeping the projectiles in poisonous compounds previous to use. Much mutual recrimination arose on this subject during the Franco-German War, showing that even at this recent date, the impression existed on the Continent. The bullets of the mitrailleuses were said to contain a calcined poisonous substance

in the lead, which poisoned the wounds and prevented their healing. The idea must have arisen from the frequency of blood poisoning among wounded soldiers before antiseptic precautions were known and understood. The remedies which were used as antidotes, and the barbarous measures adopted for counteracting the effects of the poison must have contributed in no small degree to increase the prevalence of septic poisoning, and swell the death-rate. The orifice of the wound was freely scarified to encourage bleeding, while the track of the bullet was dilated, and scalding oil poured into the channel. Not only was the healing of the wound thus retarded and septic poisoning encouraged, but the torments of the unhappy sufferer were considerably aggravated.

Remarkable Velocity of Falling Shot.—We have already referred to the treacherous nature of spent shot, and their astonishing capacity for inflicting injury. Hardly less surprising is the velocity of falling shot and their remarkably penetrative power. During the siege of Sebastopol, the men protected themselves from direct shot by sitting in the trenches with their backs against the parapet; but they were defenceless against the bullets and grape shot falling from above. In one instance a bullet completely perforated the trunk of a soldier, having entered the shoulder and passed out at the pelvis,

traversing the chest and abdomen in its course. A somewhat similar case occurred in 1859 in the Governor-General's camp in India, and attracted considerable attention at the time. A native servant was cleaning his utensils after dinner, when, without a sound being heard, he fell dead. Surgeon Mackinnon was immediately summoned, when a bullet wound was discovered on the shoulder, and after some search, the bullet was found embedded in the upper part of the thigh, having perforated the heart, lung, and liver. The bullet had evidently been fired upwards into the air by some one a long way off from the unhappy man, whom it happened to hit in its fall.

Multiple Wounds produced by a Single Shot.—The usual amount of injury which a bullet is privileged to inflict on its unfortunate victim is happily limited to two wounds, besides the intermediate track, viz., a wound of entrance and a wound of exit. Occasionally, however, we have the curiosity of multiple wounds produced by a single bullet. An officer who received a single shot in the Crimea, presented no fewer than six different apertures. The bullet passed through the arm, forearm, and side successively, making three wounds of entrance and three of exit. A still more curious case is recorded, where a bullet entered the outer side of one thigh, became split into two parts against

the thigh bone, made its exit by two apertures at the inner part of the thigh, and entered the corresponding part of the other thigh at two points. A single ball thus caused five orifices.

Vitality of the British Soldier.—When we contemplate the finished firearms and projectiles of modern warfare, it is somewhat surprising that soldiers ever escape with their lives after being shot or bayonetted in action. It apparently, however, takes a great deal to kill the British soldier, who is seemingly as tenacious of life as the proverbial cat. In one case, a soldier received four bullet wounds and two bayonet stabs, and recovered. Another soldier survived after having had five bullet wounds, viz., one of the right shoulder, fracturing the shoulder-blade, a second wound in the right armpit, fracturing the arm bone, a third flesh wound of the lower part of the arm, a fourth wound of the left elbow, the bullet making its exit at the middle of the forearm, a fifth of the left hand fracturing the middle finger, and, in addition, a bayonet wound of the right forearm.

These heroes were, however, fortunate in comparison with the ill-fated officer who was wounded at Sedan in 1870 through both arms and both legs, and had all four limbs amputated. He was riding, when a ball passed through one of his legs, through the horse, and then through the other leg. At the same time a second

bullet passed through both his arms. The horse was killed.

A remarkable Instance of Presence of Mind in a Wounded Soldier.—As an instance of cool presence of mind, the following case may be given. A young Austrian soldier was wounded at Melegnano in the left thigh, during the attack of the Zouaves. Feeling the warm blood flowing down his leg, he tore open his trousers, introduced his left thumb into the wound, and kept it in that position for four hours. At the ambulance, the principal artery of the limb was found to have been perforated, and was duly secured and ligatured by the surgeons. The wounded man dwelt with justifiable pride on the manner in which he carried out this means of self-preservation.

Proportion of Hits to Misses in Warfare.—It is a fortunate circumstance that projectiles are not infallible, and that there are far more misses than hits in war, or the curiosities and horrors of gunshot injuries would be indefinitely multiplied. For instance, 250 British soldiers expended 20,000 rounds of cartridges on the Maories in 1865 without killing or wounding one of the enemy. The proportion of hits to shots fired is even more absurd in bombardments. Lieut-Colonel Prevost, of the French Engineers, has stated that during the late Franco-German War, at the bombardment of

Verdun, the population being 9,000 persons, 33,000 projectiles were fired, killing only seven and wounding 22 persons ; at Thionville, with a population of 4,000 in the place, the bombardment lasting 53 hours, there were 30,000 projectiles fired, and only two were killed ; while at Longwy, with 200 persons in it, more than 30,000 projectiles were fired, yet no one was either killed or even wounded. It is computed that in the Crimean campaign about 1,000 projectiles, great or small, were fired for every single man killed or wounded. It has been a common observation among military men, with regard to the Franco-German War of 1870-71 that a ton of iron was expended for every man killed.

Extraction of bullets.—The extraction of bullets that have lodged is often a tedious and trying operation to both the surgeon and the patient. In the following case, however, part of a soldier's clothing not only served as a bullet extractor, but was the means of saving the wounded man's life. A soldier was struck by a partially spent bullet, which failed to make a hole in the man's shirt, but yet penetrated the cavity of the abdomen. On drawing the shirt out of the wound, the bullet came too, and the man recovered from what was very nearly being a fatal wound. Medical officers are familiar with the story of a surgeon who, after long explora-

tion of a gunshot wound, and much torture of his patient, happening to remark that he must give up further search for the bullet, was addressed with much bitterness by the wounded man in the following terms: "Is that what you have been doing all this time? Why didn't you ask me about it? I have got the bullet in my pocket."

To General Garibaldi we indirectly owe the invention of an ingenious probe for ascertaining the presence of a bullet in a gunshot wound, which is called after its inventor Nélaton's probe. General Garibaldi was wounded in the ankle joint at Mentana, and some of the ablest surgeons of Europe maintained that no bullet had become lodged in the wound. M. Nélaton, the great French surgeon, however, after his visit to Garibaldi, felt assured that the bullet was lodged in the wound, and was led to think of various devices for obtaining demonstrative proofs that his opinion was correct. He applied to E. Rousseau, the well-known chemist, to furnish him with some simple means of determining the presence of lead in a wound by chemical analysis. M. Rousseau then suggested the introduction of a body capable of bringing away a metallic impression should metal be present, such as rough porcelain. Accordingly a probe was constructed out of a slender rod of metal, terminating at one end by a small knob

of white unglazed biscuit china. If it were a leaden bullet against which the porcelain is rubbed, a very distinct mark of lead, not easily obliterated, would be impressed on it. The bullet itself would thus be caused to give ocular demonstration of its presence and place of lodgment. If the foreign body were iron, having a rusty surface, a stain of rust would be found on the china. By means of this ingenious instrument M. Nélaton convinced his sceptical colleagues of the correctness of his opinion.

History of Portable Firearms. — As bearing on gunshot injuries, a brief notice of the history and progress of portable firearms may not be out of place here. The earliest attempt at a portable firearm consisted of a hand cannon, which was carried by two men and fired from a rest fixed in the ground. We next hear of the hand gun, which was a trifle lighter and more portable. The projectiles in both cases were principally stones, and the arms were discharged by the application of a lighted match to the touch-hole. A rude trigger was the next improvement, and we find that half of the yeomen of the guard when first formed, in 1485, were armed with these improved guns, which went by the name of *arquebuses*, and were virtually the first matchlocks, such as we still see in use among some Eastern people. An important improvement took place in the time

of Queen Elizabeth, the matchlock being discarded for flintlocks. The "fusil" was a light flintlock musket which came into use about the time of Charles II. Three of the regiments still known as "Fusileers" in the British army were raised during this and the succeeding reign. There was no marked improvement in the musket until 1839, when percussion locks were introduced. The firearm which was in general use among British troops in the Peninsular Campaigns from 1808 to 1814, in the campaign of 1815, during the American war between 1812 and 1814, and in the numerous battles in which British troops were engaged in the East Indies, was the smooth bore musket which the soldiers called "Brown Bess." In 1842 the "sighting" of the arms was first adopted. In 1851, instead of the percussion smooth bore musket, a new arm was issued to the troops of the British Army. This was a rifled musket with a special projectile, invented by Captain Minié, a French officer. The essential feature of the new bullet was the addition of an iron cup at its base, by which the bullet in the act of discharge was expanded and forced into the grooves of the rifle. The gas evolved in the explosion of the gunpowder was thus entirely prevented from escaping by the side of the bullet, securing for the missile a longer range and greater accuracy of flight. In the year 1855, when the Russian war was raging,

a longer and more effective weapon was placed in the hands of the British soldier, known as the Enfield rifle, and at the same time improved compressed bullets were used instead of the ill-made bullets which were cast in moulds.

At the time of the Crimean War, Whitworth rifles with hexagonal barrels were advocated, but, after a brief trial, were rejected.

In 1858 the first breechloaders were introduced under the name of carbines, which were issued only to a few cavalry regiments. In 1864 all the muzzle-loading Enfield rifles were converted by a system devised by Mr Snider into breechloaders.

In 1866 the Government offered a prize for the best rifle for military purposes, and a new arm, the Martini-Henry Rifle, was formed out of two of the competing weapons, the Henry Rifle and the Martini Rifle, by uniting the barrel of the former to the breech of the latter.

CHAPTER XVI.

METHOD OF ARRESTING HÆMORRHAGE IN WOUNDS.

THE first and most important lesson in surgery, in connection with the treatment of wounds, is that which relates to the various methods of arresting hæmorrhage or bleeding. That the blood is the life is not merely a poetical truism, but a literal physiological fact. When, therefore, by disease or accident, a serious loss of blood is threatened, we must be prepared to take prompt and effectual measures for controlling the bleeding.

The ancient surgeons did not recognise the vital importance of economising blood, as the lancet was their favourite resource; and there were few diseases, great or small, for which bleeding and purging were not regularly prescribed. Although the value of general blood-letting in certain suitable cases is undeniable, the subsequent evils which its indiscriminate practice produced, especially in feeble subjects, were considerable, often causing injury to the constitution, from which these patients seldom

completely recovered. Modern surgeons gain the same ends as those for which blood-letting was practised, by employing other means, which do not entail the loss of a single drop of blood. By the administration of such remedies as Digitalis and Tartar Emetic, which are powerful depressors of the heart's action, the force of the circulation is diminished, the throbbing pulses are tranquillized, and the high pressure of congestive and inflammatory conditions is relieved almost as effectually as by opening a vein, without the objectionable depression which follows depletion. Even at the present day, the practice of blood-letting is occasionally resorted to, when the patient is a robust young subject, physically capable of bearing the loss, with impunity, of half-a-pint or more of blood. The practice is however fast dying out, and will probably ere long be entirely abolished from surgery.

Coagulation or Clotting of the Blood.—There is a certain peculiarity of blood which amateur surgeons would do well to study carefully, as it has a most important bearing on the subject of bleeding and its treatment. This is its property of coagulating or clotting. Some idea of its importance may be formed from the fact that, were it not for the coagulating property of blood, we should bleed to death the very first time we cut or pricked our finger. The first

crimson drop which oozed out at the wound would be wiped away, to be quickly replaced by another and another, until faintness supervened from loss of blood, and life itself was slowly sapped by the ceaseless drip. The surgeon would ligature a divided artery, and for a day or two the spurting vessel would be controlled. As suppuration however set in and loosened the ligature, if coagulation had not taken place in the meantime, the crimson jet would commence to play again. Even were ligatures successful under such circumstances, in arresting hæmorrhage, where is the surgeon who would pick out and tie each individual of those minute blood-vessels, called *capillaries*, invisible and intangible, by their microscopic dimensions, though not too minute to bleed freely when divided. Owing to the coagulating power of blood, ordained by a merciful Providence, when these minute vessels, which throng every atom and speck of tissue in our body, are injured, as they are constantly liable to be by accidents, their divided ends are quickly sealed up by the congelation of the blood, which circulates there, and the bleeding is spontaneously controlled, without the interference of impotent man.

Cases have been occasionally met with by surgeons where, from some constitutional fault, the coagulating power of the blood is defective.

In such instances, which are fortunately not frequent, persons are liable to bleed to death after such trifling operations as tooth extraction and leech bites.

Let us now examine this property of the blood a little more closely. Blood circulates, as we all know, in arteries and veins. From the heart it is carried by arteries, which diminish in size as they go farther from the circulatory centre, branching again and again until they terminate at the commencement of those hair-like vessels called *capillaries.* From the other end again of the capillaries arise the radicals of the veins, which carry the black blood back to the heart, increasing in calibre as they approach that organ. The capillaries are thus seen to occupy an intermediate position between the termination of the arteries and the commencement of the veins. Their function is to act as a medium of communication between the blood and the tissues which it feeds. The walls of the capillaries are so thin, that the tissues can imbibe their nourishment through them with as much ease as if they were in actual contact with the blood. Not only is nutriment drawn from the blood through the capillary walls, but waste and used-up tissue enters the circulation by the same means, and imparting a black tint to the blood, is carried away by it to the heart, and thence to the lungs to get the purifying breath of oxygen.

The capillaries being the only media of communication between the blood and the tissues, it follows that there must be capillaries wherever there is tissue to be fed and sustained. Consequently we find capillaries thickly distributed in every part of the body. We cannot prick any part of the skin without producing capillary bleeding, and let the needle point be ever so fine, it cannot avoid wounding some of these fine blood vessels, which form a dense network round about the parts dependent on them for life and sustenance.

On account of the extremely fine calibre of the capillaries, the impulses of the heart's action are not transmitted to them, and consequently, when capillary bleeding takes place, the blood oozes out in a slow and continuous stream. When, however, an artery is wounded, the blood issues in spurts, corresponding to the impulses of the heart's contractions.

As long as blood is circulating in arteries, veins, and capillaries, it remains fluid, but the moment it is shed, and thus withdrawn from the magic influence of those living vessels, a curious change comes over it. It gradually thickens and solidifies into a jelly-like mass.

Though physiologists have vainly endeavoured to find out the causes of coagulation, we cannot fail to observe that its obvious use is to act as a safeguard against excessive and

injurious losses of blood, and one is lost in admiration at the matchless provision of Nature, which compels the evil to furnish its own remedy, independently of extraneous help.

Were it not for the tendency of drawn blood to clot and solidify, it would escape from a wounded artery like water from a tap, until the system was drained of its vital treasure, and the most trivial cut or scratch would acquire a significance perfectly appalling.

If we would adopt rational methods of arresting hæmorrhage based on correct principles, we must carefully study the natural influences which favour coagulation, and adapt our treatment in conformity with that of Nature.

The most important condition necessary for coagulation is, that blood must be in a state of comparative rest. Just as rapidly running water does not freeze, we find that blood, so long as it is ejected with force from a vessel, will not solidify or clot. Our great aim, therefore, must be to produce even a brief repose for the escaping blood, until it finds its own abiding remedy in coagulation. If it be a blood vessel of appreciable size, from which the bleeding is taking place, we tie the artery and temporarily check the hæmorrhage. In a few days, the process of suppuration setting in, the ligature loosens and comes away ; but a firm plug of coagulum now permanently closes up the mouth of the

injured vessel, and the ligature is no longer required.

If it be capillary bleeding we have to cope with, it may be retarded by the application of pressure by means of pads and bandages, with the view of hastening coagulation.

Another method of causing the blood to be at rest, which is so essential to coagulation, is the employment of internal remedies for depressing the heart's action and retarding the blood currents. In this way Digitalis becomes a valuable remedy in the treatment of hæmorrhage, and is frequently resorted to by physicians, when the bleeding proceeds from internal organs such as the lungs and stomach. A low temperature is found to retard coagulation, and yet cold is one of the most valuable remedies in the treatment of bleeding. The value of cold as a styptic, however, depends on its tonic action on the vessels, stimulating them to contract, and indirectly favouring coagulation by restraining the blood flow.

The Use of Styptics.—There are a class of remedies, of which iron and alum are examples, which act as powerful local styptics, by producing a spurious form of coagulation, the result of chemical combination between them and certain constituents of the blood. The expeditious way bleeding is stopped by their application is surprising. The blood is instantaneously curdled

or corroded on coming into contact with them, caking into a crust, which adheres to the skin and forms an effectual seal. As a young carpenter once remarked to me, while watching the effect of a single drop of solution of steel on the blood issuing from a chisel wound on his hand, " Lor, sir, how it do freeze up the blood."

Coagulation is also favoured by the contact of blood with foreign matter, especially substances which afford numerous points of contact. Cobwebs are a traditionally favourite styptic, as blood readily coagulates in their intricate meshes. Cotton-wool and lint are also suitable applications on the same principle.

It must not be supposed that the application which stops bleeding most effectually is necessarily the best under all circumstances. Due regard must be had to the future welfare of the wound, and the least irritating styptic that would fulfil the purpose must be chosen, so as not to encumber the subsequent healing process.

The smooth surfaces of a clean cut incised wound adhere together when healing, by what is known as the *first intention*, *i.e.*, without forming matter, and with only the thinnest layer of lymph interposed. When healing takes place under these favourable conditions, there is little or no scarring left behind. But if the wound is plastered up with irritating and

caustic applications, however effectually they may control the bleeding, their presence acting like foreign matter, sets up undue inflammation in the wound, retards the healing, and produces scarring and disfigurement of the part. In wounds of the face and other exposed parts, these are details especially worth the consideration of the surgeon, and no qualified person can be held blameless, who wilfully or carelessly permits such blemishes, when they can be perfectly well avoided by forethought and care. It is even preferable to lose a little extra blood, than be compelled to use harsh styptics and risk the purity, if I may term it, of the "first intention."

It is a common practice with persons when they have cut their finger, to wrap up the wounded member in a small mountain of rags, and to leave it in this condition unattended to for several days. Like the ostrich, they think that as long as they do not see danger, there cannot exist any. But there is always danger in uncertainty, and it is impossible to say what bleeding may be going on under the pile of rags, or in what foul condition the wound may be after a day or two's neglect in the matter of cleanliness and suitable dressing. The safest plan is to look the danger at once full in the face, and ascertain the exact nature and extent of the injury. In many instances the gravity of

the case diminishes considerably on a thorough investigation, while the shrinking policy of timidity tortures one with fears of evils which do not exist. Like a mountain partially hid by mist, the imagination always exaggerates its size, in endeavouring to complete the outline.

The writer was once hastily summoned to attend a man who had fallen down, it was reported, and severely injured his head in three places. On examination only one small scalp wound was discovered, from which blood was trickling through two different channels in the locks of his hair. The friends were surprised when the head was cleansed and dressed to find the apparently multiple injury reduced to one small insignificant cut.

Cold Water one of the best Applications for ordinary Incised Wounds.—One of the cleanest, simplest, and most effectual applications for bleeding wounds, is cold water. It is always at hand, it does not irritate the wound, it washes away impurities, it controls bleeding by its tonic effect on the part, it favours healing, and is clean and comfortable. For incised wounds there is nothing equal to it. In the case of a cut finger for instance, a long strip of lint, 2 inches wide and 12 inches long, should be soaked in cold water and whipped round the injured part with moderate pressure, the end

being secured with a stitch, and the lint moistened frequently with water for the next ten or twelve hours. At the end of this time, if the bandage be removed, the wound will present a smooth clean appearance, every stain of blood washed away, and the edges closely adherent. If a strip or two of isinglass plaster be now crossed over the wound, and the finger of an old glove drawn over it, nothing more will probably be required, and in a few days the cut will have completely and neatly healed up. The simpler the applications and methods of surgery, the better.

It must however be remembered, that in some irritable constitutions, wounds do not heal kindly, however carefully and skilfully they may have been attended to. A bad healing skin is a common phrase among unprofessional persons, and is not altogether destitute of scientific meaning.

If instead of the simple method here given, metallic or other styptics had been employed for controlling the bleeding, and the wound packed with cobwebs, sticking plaster, and dirty rags, Nature would revenge herself by declaring war, using as her weapons inflammation and suppuration to repel the enemy. Although she usually comes off victorious, it is not without bearing traces of the conflict. Excessive inflammatory action has disabled the surfaces

of the wound for primary adhesion, and they must be brought together now by the interposition of new tissue, which grows out of the bottom of the wound. This new tissue, however, is like a patch in a garment; it is a blemish, however skilfully and neatly applied.

Should bleeding persist after the treatment indicated above, a piece of lint wrung out of a saturated solution of perchloride of iron in glycerine must be laid on the wound, a small pad of lint placed over that, and the whole secured by a firmly applied bandage. This will control the most violent capillary hæmorrhage, and if care be taken that the styptic is not too thickly applied, and that it be removed as soon as it has served its purpose, it will not materially injure the future progress of the wound.

Dangerous Regions of the Hand for Cuts.—As the hand is a part that is frequently subject to injuries in which bleeding is a prominent symptom, it may be useful to indicate the regions of this member where the arteries lie.

Important vessels are disposed in the hollow of the palm, any injury to which is especially serious on account of the difficulty of seizing and tying an artery in this situation. The accident is liable to happen occasionally from the breaking of china or glass in the hand, and from stabs inflicted with pointed instruments.

The vessels in this locality being bound down by the tough tendinous structures of the palm, it is not easy to find the bleeding points, much less to tie them. To cut down on the part and expose the vessels would often inflict such an amount of injury as to imperil the safety of the hand. Under these circumstances, the only available remedy is to ligature the artery at a part of its course further up; at the wrist or at the upper arm, which would involve a delicate surgical operation of some importance.

In the finger, the arteries lie along the sides and in the clefts between the digits. The front and back of the fingers, the most frequent situation of cuts and other injuries, are fortunately unoccupied by blood-vessels of any size. Cuts in the web of the fingers are awkward accidents, on account of the difficulty of maintaining the injured part at rest, and keeping the lips of the wound in close apposition. They are not, however, likely to cause troublesome bleeding, as is commonly supposed, unless the artery at the bottom of the cleft is wounded. On each side of the front of the wrist are two important vessels, the artery of the pulse and its companion. Less important vessels are distributed over the back of the wrist. on the ball of the thumb, and along the back of the hand, in the spaces corresponding with the hollows of the knuckles.

Arteries bleed freely when cut across, but there is no danger of Hæmorrhage when they are torn asunder. — It is a curious fact that arteries bleed only when cut or divided by a sharp instrument. If torn asunder by violence or severed by a blunt weapon, they show no inclination to hæmorrhage. In cases where limbs have been caught and crushed or torn off by steam machinery, the comparative absence of blood has been a striking feature. Although injuries of the most frightful nature may have been inflicted, the vessels are as secure from bleeding as though some special providence had protected them. In severe gunshot injuries, where the parts are shattered and disorganised by heavy missiles, no experienced surgeon ever anticipates such a contingency as hæmorrhage. It is the sabre slash and the bayonet thrust that he dreads, as the class of wounds from which bleeding may be expected.

This phenomenon is caused by a peculiarity in the anatomical construction of the arteries. Every artery has an outer, middle, and inner coat. The two latter being the weaker coats, are the first to give way on the application of violence; and breaking off short, they become retracted by their elasticity within the outer tough coat, which is dragged and twisted over them in such a way as to offer a complete barrier to the escape of blood.

The Scalp and the Face are rich in Blood Vessels.—Wounds of the scalp bleed freely, there being a liberal supply of blood in this region, yielding nutrition to the roots of the hair. Pressure as a remedy is, however, always available, on account of the hard resisting skull which everywhere underlies the scalp. A firm pad soaked in cold water and firmly bandaged to the part, or even the pressure of a finger-point maintained for half-an-hour or more, is nearly always sufficient to control the most obstinate bleeding.

The surface richest in blood vessels, however, is that of the face, where the slightest cut gives rise to smart and persistent bleeding, as we know from our erratic experience, when shaving with a careless or unsteady hand. The treatment of hæmorrhage in this quarter must be conducted with careful consideration for the future of the wound, with a view to avoid undue scarring and disfigurement. We must, therefore, avoid irritating styptics, using water alone, and as few strips of plaster as possible.

CHAPTER XVII.

THE DRESSING OF WOUNDS.

THE next point which must engage our attention, after the subject of arresting hæmorrhage, is the cleansing of the injured part and the removal of foreign matter from the wound.

Removal of Foreign Matter from Wounds.—Stones, earth, bits of glass, fragments of nails, needles, and thorns, and various other substances may become lodged in the wound, and give rise to injurious irritation, unless promptly removed. As an instance of the remarkable power for evil which the smallest particle of foreign matter is capable of exerting in a wound, I may state the following case which recently came under my notice:—A man who was sitting beside the driver, during a cab accident, was severely hurt, having sustained among other injuries a long lacerated wound of the leg. The wound having been temporarily dressed by the writer, the patient was conveyed to the hospital, where he was duly attended to. Week after week elapsed, however, without any improvement in the wound, inflammation and suppuration unaccountably

persisting in spite of every effort to moderate them. Fearing at last that there might have been some undiscovered foreign matter still retained in the wound, the stitches were removed and a thorough search begun. At the end of a long and careful exploration, one single grain of oats was discovered, on the removal of which the wound at once took on healthy action, and gradually healed up. The grain of corn was obviously derived from the nose-bag, which the cabman carried beside him on the box.

Occasionally the extraction of foreign matter, such as the points of needles or thorns, is attended with considerable difficulty, and may require the use of the knife for exposing and seizing the offending body. In other cases, they may be removed by a little patient manipulation with the point of a pin, while the part above the wound is firmly squeezed. Metallic substances will remain for indefinite periods of time, without exciting much irritation, but organic substances, such as thorns or even the material used for ligatures, which are subject to decomposition, must be removed with the least possible delay, as their presence is violently resented by the tissues in which they are embedded.

How to control Bleeding when examining a Wound for Foreign Substances.—Every wound should therefore be carefully examined for particles of foreign matter which may have acci-

dentally gained entrance, before it is finally closed up and dressed. Occasionally this is impossible, owing to the welling of blood, which fills the wound as fast as it is cleaned up, and obscures everything but itself from our sight. This difficulty may be overcome by placing a thumb on one edge of the wound, the forefinger on the other, and exercising firm pressure downward to compress the blood vessels, while at the same time the lips of the wound are forcibly dragged apart. A good view is thus obtained of the cavity of the wound, which presents a perfectly pale bloodless appearance, as long as the pressure is sufficiently maintained. In this way I have repeatedly dissected out needles from wounds, the complete absence of blood enabling me to see distinctly what I had been about, and to conduct my operations leisurely and with precision.

Methods of bringing the Lips of the Wound together, with Special Remarks on the use of Sticking Plaster.—Having controlled the bleeding and cleansed the wound, the next operation is to bring the edges together and maintain them in proper apposition by suitable appliances. In extensive flesh wounds with gaping lips, it becomes necessary to resort to stitches, silk thread and silver wire being the materials used for this purpose. But the employment of these measures requires some professional judgment

and technical skill, and they are therefore not to be lightly undertaken by the amateur surgeon. An illustrative case of this kind came under the writer's notice some years ago. A forester, while employed in felling trees, met with an accident by the slipping of his axe, the weapon cutting through his boot and inflicting an angular flesh wound on the ankle. His son, overflowing with surgical zeal born of filial affection, promptly sewed up the wound as he would have sewed up a rent in a sack of corn, dragging at the stitches to make the retracted edges meet. The tension gave rise to severe inflammation, swelling and pain, and during the night the patient was compelled to rise out of bed and cut the stitches to obtain relief from the torments he had been suffering.

In wounds of less importance the edges are conveniently brought together by means of adhesive plaster. There are several kinds of sticking plaster. Resin plaster is the most adhesive, but is objectionable on account of the sticky resinous matter it leaves behind, and which is apt to irritate the wound. For cuts in the face and other exposed parts, where scarring is specially undesirable, the use of resin plaster is not to be recommended. Soap plaster is less irritating, but not so reliable, where accurate coaptation is aimed at. Isinglass plaster is an elegant appliance and sufficiently adhesive for ordinary purposes. Whatever plaster be selected, it must be cut

into thin strips, and no more used than is absolutely necessary for the purpose in view. The best way to heat the plaster is to pass the strips through hot water, or hold them for a moment, face outermost, against the sides of a tin can filled with boiling water. Plaster properly applied, not only serves to keep the edges of the wound together, but relaxes the neighbouring tissues and relieves tension at the line of union. With this view we must employ long strips, by means of which we endeavour to pinch or squeeze together the tissues surrounding the injury, leaving the edges of the wound to fall together.

When plaster is used for wounds of the scalp the hair must be carefully shaved off. Merely clipping the hair with scissors is not enough, as the short bristles are awkward obstacles to firm adhesion of the plaster. The use of a razor in the neighbourhood of a wound may appear a refinement of cruelty, but it need not be so under the direction of a surgeon.

As a rule, plasters should not be applied until all oozing from the wound has ceased, as otherwise they are apt to become stiff and hard with dried blood, and set up irritation, if indeed they succeed in adhering at all. The bleeding should first of all be stopped by the application of wet lint, as previously recommended.

It must not be supposed that the first dressing of a wound constitutes the whole or even the

principal portion of the treatment. The after management of the case is the part on which the welfare of the wound chiefly depends, and which, more than any other, exercises the tact and judgment of the surgeon. The primary dressing is essentially a routine of mechanical methods. Not so, however, the subsequent management, as unfavourable complications may arise at any moment, which the vigilant surgeon must be ever prepared to encounter, and with infinite resources and skill to combat.

The after treatment of wounds may be briefly summarized under the following heads: (1) cleanliness, (2) exclusion of air, (3) employment of antiseptics, (4) mechanical support, (5) rest.

Importance of Cleanliness in the treatment of Wounds.—The familiar proverb, "Cleanliness is next to Godliness," might be appropriately transposed in the creed of surgery to "Cleanliness is Godliness," so important is this negative virtue in surgical treatment. Many wounds will heal by simply excluding dirt from them. Nature's great business, Nature's greatest pleasure is to heal, if we would only facilitate her desires and promote her object. She resorts to strong measures only under extreme provocation, and is even forbearing when human perversity and human ignorance thwart her

benevolence. In many cases, we are far better to stand aside altogether, and let Nature do her work without interference. Meddlesome surgery is Nature's greatest foe in the disguise of a friend, crippling her resources, and passing for wisdom and skill in the eyes of credulous simplicity.

I would specially urge the doctrine of cleanliness on nurses, as on them generally falls the duty of dressing wounds. What a comfort besides to the patient to feel that this godliness of surgery is with him; to feel the sweet sanctity of soap and water, and the refreshing consolations of clean lint and bandage! How serene and tranquil he is after the morning incense of washing and dressing! One can imagine the complacent satisfaction, as it were, with which the blood regards a cleanly kept wound, as it passes by in the course of its circulation, and its angry frown and uneasy agitation on encountering the septic evidences of neglect and slovenliness, disturbing, by its displeasure, the general harmony of the system, evolving erysipelas, inflammation, and blood-poisoning in its wrath.

Exclusion of Air from Wounds.—The exclusion of air is the next condition necessary for healing. Whether it be the gases of the atmosphere, its low temperature, or the septic germs in which it abounds, or whether it be the

combined effect of all three, are questions on which much might be said, and therefore had better be left unsaid here. It is certain, however, that air acts as an irritant, from which the wound must be carefully guarded by suitable dressings.

Employment of Antiseptics.—As regards the use of antiseptics, it is not indicated in every trifling wound, least of all in incised ones. The slightest evidence, however, of unhealthy action is a signal for its employment; and in wounds in which septic action may be reasonably expected to occur, the contingency must be anticipated by timely recourse to antiseptic applications. Nothing is better suited for the purpose than solutions of carbolic acid in olive oil, in strengths ranging from one and a-half to twelve per cent., according to the condition and requirements of the wound.

Bandages.—Mechanical support is a useful auxiliary in treating wounds. It is usually supplied by pads and skilfully graduated bandages, which not only afford support, but promote moderate circulation of blood about the part and stimulate the process of healing.

Rest essential to the Healing of Wounds.—The necessity for rest is obvious. The contraction of muscles by exercise of the part must be prevented, and anything but the most gentle circulation in the neighbouring vessels is in-

jurious. It is a well-known fact that fractures of bones in horses and cattle are seldom recovered from, on account of the great difficulty of keeping the parts at rest, and not, as is popularly supposed, because their bones are unusually dense and hard. What a libel on Nature to think that her own handiwork would baffle her benevolence, that the clay would rise up and defy the potter! Why, those very means by which nutrition is supplied to the structures in health, are ample to furnish the cementing medium for their repair when dismembered. The very fact of its existence is a sufficient guarantee that there is provision for the densest and most callous organic structure in the hour of its need. A farmer of the writer's acquaintance had a valuable calf, which met with an accident by which one of its legs was broken. By the advice of the writer, the leg was put up in splints, as in an ordinary human fracture, and the bovine baby-patient slung up in a broad band of webbing. For the following six weeks, the gentle sufferer had his home in mid-air, chewing the cud in aerial complacency. The experiment, my friend afterwards assured me, was a complete success. The usual fate of cattle or horses who are so unfortunate as to get a leg broken, is summary destruction, due no doubt to the heresy already alluded to, that their bones do not heal. It would be a more

merciful plan to perform amputation, and provide wooden legs, as an ingenious veterinary surgeon had lately done in the case of a crippled cow in one of the midland counties of England.

CHAPTER XVIII.

THE MANAGEMENT OF LACERATED WOUNDS.

We have hitherto confined our remarks to the consideration of incised wounds, the essential feature of which is, that they are inflicted by a sharp-edged weapon, and in the treatment of which our great object is to moderate inflammation and induce close and accurate union of the sides and edges. Lacerated wounds, on the contrary, are those produced by the tearing or laceration of the skin and subjacent tissues by means of blunt instruments. Accurate union by the first intention is impossible in lacerated wounds, and no one who is acquainted with the first axioms of surgery ever looks for it. Inflammation, of which the least possible degree is all that is required in the former injuries, is the natural sequence of lacerated wounds, and is anticipated as an essential part in the process of repair peculiar to them. Their treatment must therefore be conducted on entirely different principles. The reason of this is obvious, if we give the subject a moment's thought. In lacerations, not only are the tissues

divided, but a great amount of additional local injury is inflicted, by the dragging and rude violence to which they are subjected, compared with the smooth clean way in which a sharp cutting edge cleaves the tissues. As a result of this dragging and tearing, we find a great many minute articles of dead tissue along the line of injury, the sloughing away of which makes inflammation in its various stages a necessary evil in all but the most trivial forms of lacerated wounds.

Antiseptics specially required in Dressing Lacerated Wounds.—The first and most important indication therefore in the treatment, derived from these considerations, refers to the use of antiseptics. Each devitalized molecule of matter acts as a centre of septic contagion, which must be neutralized by antiseptic applications, or contamination of the wound will certainly ensue. Lint wrung out of a three or four per cent. solution of carbolic acid in olive oil, is one of the best applications for this purpose, not only as counteracting septic tendencies and keeping the wound sweet, but as a comfortable and soothing salve, under the influence of which the process of healing proceeds smoothly and satisfactorily.

Plasters in Lacerated Wounds.—Plasters are used in lacerated wounds less for maintaining the sides in strict apposition than for affording

support to the parts. If employed in the same way as for incised wounds, they will probably serve only to aggravate the inflammation and incite a natural process to mischievous excess. No clearer proof of incompetency could be betrayed by anyone pretending to the slightest knowledge of surgery, than such a misuse of plaster, as it implies a failure of simple surgical apprehension, or a limited amount of surgical common sense.

Instructions for Dressing a Simple Lacerated Wound.—A simple example of lacerated wounds is furnished when a child falls down on a gravel path, cutting and bruising his knees on the rough stones. The first thing to be done in such a case is to wash the injured parts, and remove the dust and stones which may be adhering to them. A solution of carbolic acid in oil is next to be made, by adding two drachms of pure liquid carbolic acid to four ounces of best olive oil, and shaking up the mixture. A piece of lint, a little more than twice the size of the wound, and folded in half, with the fluffy sides inside, is to be wrung out of the carbolic oil and placed on the wound, and covered by a piece of oiled silk or gutta percha tissue, of the exact size of the lint, to prevent too rapid evaporation of the oil. Over this may be placed a soft pad, composed of two or three folds of soft lint, while a few turns of a roller

bandage will serve to keep the dressings in their place, the wound being washed and dressed morning and evening. This application will be found both comforting to the patient and conducive to rapid healing of the wound. Lacerated wounds are troublesome injuries to deal with, when they are situated over bony prominences, such as the sharp ridge of the shin and the point of the elbow. There is a tough membrane underlying the skin at these situations, called the fascia, which becomes implicated in the sloughing process, and protracts the healing.

The smallest Bridge of Skin connecting a torn part with the rest of the Body, is often sufficient to make it grow on again.—There is a popular notion that a part which has been entirely severed from its connection with the body, by injuries, will grow on again, if quickly replaced. I have neither seen any such cases, nor found authenticated accounts of them in professional works. However that may be, it is certain that a very small connection with the neighbouring tissues is sufficient to preserve its vitality and to enable it to become attached again if replaced. This is especially true of the scalp. Though the scalp may be extensively torn up, and considerable portions of it hanging from the head, if they retain their connection by the smallest bridge of skin, it is amply sufficient to enable them to adhere again if duly replaced.

CHAPTER XIX.

PUNCTURED AND POISONED WOUNDS.

PUNCTURED wounds are those inflicted by long pointed weapons, and are not remarkable for bleeding, except as in sword and bayonet thrusts, where the weapon has cutting as well as penetrative power, and is large enough to cut a free channel for bleeding. In former days, when duels were fought with the small sword, certain men called "suckers" were always in attendance on the combatants, whose duty consisted in sucking the air and blood from the wound, and afterwards applying with an air of great mystery, a pellet of chewed paper to seal up the orifice. Barbarous and rude as this method seems, it was correct in principle and successful in practice, fulfilling as it did the important indications in the treatment of punctured wounds. The clogging of blood, and the presence of air in a deep cavity, inaccessible to the ordinary measures for keeping it clean and antiseptic, are the two great adverse conditions, favouring decomposition and blood poisoning, which this treatment tends to counteract, besides

the salutary effect of suction in drawing together the sides of the wound.

Punctured wounds are liable to a troublesome complication, when a portion of the penetrating instrument breaks off and becomes embedded in the flesh. The most common form of this accident happens with needles, and should be brought under the notice of the surgeon with the least possible delay, on account of the well-known tendency of broken needles to migrate in the tissues beneath the skin. The most dangerous situation in which an accident of this sort can happen is the front of the knee.

When barbed instruments such as fish hooks and crotchet needles are run into the flesh, no attempt is to be made to withdraw them through the same aperture by which they entered, but the point should be pushed in so as to emerge from the skin, the shank then divided with pliers, and the barbed end drawn out.

Poisoned Wounds.—The next class of injuries is that of poisoned wounds, embracing the stings of insects, the bites of snakes and rabid animals, and dissection wounds. The stings of bees and wasps give rise to considerable irritation, often producing great constitutional depression in feeble constitutions. Stings in the neighbourhood of the eye and the inside of the mouth are particularly dangerous. A case is reported of a person who swallowed a bee with

a piece of honeycomb, and was stung in the back of the throat, which swelled up to such an extent, that the patient was for some time in great danger of suffocation. When bees in large numbers swarm upon and sting a person, they are capable, by their aggregate efforts, of producing a very grave and even fatal injury. The best application for the stings of insects is strong ammonia mixed with olive oil, in the proportion of one of the former to three of the latter, to be rubbed on the parts for a few minutes, with brandy and bark administered internally, where there is much depression.

The bites of snakes and rabid animals need not detain us. The bite of the viper and the adder, the only species of snakes met with in England, are not considered dangerous, except under very exceptional circumstances. The application of ammonia as for insect stings, is in most cases a sufficient remedy for their bite. The bites of rabid animals has been already under consideration in a previous chapter, and is too serious an injury to be dealt with by amateur treatment. The foolish practice of indiscriminately cauterising every dog bite, under the idea that it is a wise and effective precaution, is to be deprecated. In many cases it is the most unwise thing to do, as tending only to provoke the wound, and compelling it to absorb the poison, when it would have otherwise remained inactive and inoffensive.

Dissection wounds are those in which dead or putrescent matter is inoculated, as in the case of wounds received at post mortem examinations, and during the dissection of the dead body. The greatest danger in connection with these wounds is derived from the state of the patient's health at the time of the injury. It is a well-known fact among teachers of anatomy, that dissection wounds are more fatal at the end of the session, when students are worn out by study and anxiously looking forward to their examinations, and therefore more depressed and less capable of resisting the poison, than at the commencement of the session, when they are fresh and vigorous and capable of repelling septic influences.

CHAPTER XX.

CONTUSIONS.

By contusion, we mean an injury to the soft parts without actual break or rupture of any part of the skin over them. The muscles beneath the integument may be bruised and torn, and considerable bleeding may have taken place from injured vessels; but as long as the skin is unbroken it is only a contusion. The great distinguishing feature of this form of injury is that no air reaches the damaged tissues, to unduly interfere with their efforts at repair. The blood effused subcutaneously undergoes changes of colour in the process of absorption, from purplish red to green, yellow, and brown.

The treatment consists in applying evaporating lotions, such as vinegar and water in equal parts, or one part of spirits of wine to eight parts of water. The lotion may be applied on lint and renewed as often as it becomes dry. If the blood cannot be absorbed in this way, it will probably be discharged by an abscess forming and bursting in the situation of the

contusion. The application of leeches is useless, as extravasated blood cannot be withdrawn by means of them, while their bites often serve to inflame the part and give rise to suppuration and abscess.

CHAPTER XXI.

CONSTITUTIONAL PECULIARITIES OF BABYHOOD.

DURING the first twelve months of its existence, a baby is an anomalous being. Anatomically and physiologically, it is a different creature in many respects from the matured individual into which, if fate permit, it is destined to develope. The care and management of babies must therefore be conducted on special principles, with due regard to the conditions peculiar to the stage of infancy.

For example, a baby is not provided with teeth like an adult. Its food must therefore be administered in a fluid form. But as no artificial food can be conveniently made to contain in fluid combination all the essential elements of the ideal nutriment, viz., the oleaginous, the saccharine, and the albuminous principles, Nature comes forward and anticipates the difficulty by furnishing a ready-made elegant emulsion, in which these ingredients are mixed in suitable proportions. Milk is a remarkable compound prepared in Nature's laboratory, in-

volving a double chemical process in its production, the conversion of food into blood, and the election of certain elements from the blood in definite proportions, and their elaboration into milk. Milk is therefore the natural food of infants, though many mothers and nurses appear not to understand the plain and obvious dictates of Nature, wilfully disregarding her silent but eloquent precepts, and taking the earliest opportunity of substituting for the natural diet, which is a perfect model of nutriment, the feeble and clumsy preparations of art.

Again, a baby's stomach is not a capacious bag like that of the adult. It is simply an elongated cylinder of limited capacity, fitted neither for receiving large quantities of food nor for retaining its contents for any length of time. Consequently, an infant must be fed frequently, and only a moderate quantity of food administered at each meal. If the former rule be violated, which is not often however the case in ordinary practice, the infant will soon enough make its grievance known by the unmistakable roar of hunger, while the sin of repletion is instantaneously expiated in summary rejection of the contents of the stomach.

But even in an infant's stomach there is a limit to the frequency with which food supplies can be accommodated with impunity, and the prevailing practice of resorting to the bottle or

breast every time a baby cries is a piece of folly, for which the child is made to pay, sooner or later, the certain penalty of indigestion.

Another peculiarity of the baby's organization is that its nervous system is sensitive to a remarkable degree. The irritation of a cutting tooth is sufficient to induce a fit of convulsions. The exhaustion which follows a neglected diarrhœa will often produce grave derivative symptoms referable to the brain. Dangerous cerebral irritation and even fatal convulsions are known to have been excited in infants by sudden alarm. Physiologically viewed, there is nothing strange about these characteristics of infancy, as they are precisely what one would expect in a being who is the subject of rapid nutrition and growth.

In infancy the consumption of oxygen is relatively smaller, and the power of generating animal heat is proportionately less than in more advanced periods of life. The importance of warm clothing and avoidance of undue exposure to cold must therefore be specially kept in view in the case of babies.

The secretion of saliva is not established in infants until they are three months old. It is therefore highly improper to feed a child on farinaceous articles of food, such as arrowroot, sago, or corn flour, until it has attained this age; as saliva is indispensable for the proper diges-

tion of starchy compounds, it being the agent by which they are chemically acted upon and converted into grape sugar, preparatory to absorption into the blood.

Infants are moreover incapable of communicating their sensations except by inarticulate cries, which are an intelligible language to those who by dint of patience, perseverance, and long observation, have learnt to rightly interpret them, but are a distracting puzzle to the novice, and to those who do not think it worth their while to devote time and attention to the acquirement of this faculty.

CHAPTER XXII.

IGNORANCE OF YOUNG MOTHERS ON THE MANAGEMENT OF INFANTS.

THE natural guardian of a baby is its mother. Does she sufficiently appreciate the peculiarities of infant life, such as I have attempted to shadow forth, to make her a fit and proper person to have the custody of her offspring? If so, from what source has she received her education, this exceptionally happy and privileged daughter of Eve; or is she the phantom of an ideal world, where the care and management of babies is taught side by side with modern cookery and scientific dress-cutting, where everything that affects a baby's comfort and welfare is not hidden and veiled away, as if it were something indelicate, but looked upon as a possible and even highly probable contingency, and duly anticipated and provided for by timely training and education?

I am not aware that the physiology of infant life, or even the routine management of babies, forms any part of a young woman's education. A prominent place is given to music and French,

to dancing and deportment, and even domestic cookery is finding a place in the list of modern female accomplishments; but with the perversity characteristic of fine fashions, the lessons of first and vital importance to every girl are notoriously suppressed, to be picked up casually —too often by heartaching experience. Society is precious particular how a girl carries herself when entering a drawing-room, but it takes no account of the high art of nurturing those helpless supplicants for all the scientific care that can be bestowed on them.

I never knew a young mother who was not as ignorant as her own first-born infant of every particular connected with its management and feeding; and other medical men will, I am sure, confirm my experience. Mothers with large families are taught by experience and acquire proficiency by practice and observation, though they may have passed their noviciate in the same deplorable ignorance as their younger sisters. They are justly proud of the knowledge acquired by long experience, and even the doctor will be disposed to pardon them, if they think they know a great deal more of such matters than himself. For my own part, I am never above profiting by hints from the mother of a large family on the subject of infant management, as they are invariably the fruits of mature experience, without which no one,

however learned in book lore, can excel in this difficult department of study. Dr West, one of the greatest of our authorities on the diseases of children, relates with pride how he used to take his place beside his little patients, observing them closely for hours together, and carefully noting every phase of their troubles. In this way alone, he remarks, he gained his greatest treasures of knowledge on children's diseases.

The mother being ignorant of her duties, the infant passes to the care of the nurse. I am not enamoured of nurses as a class, and deem them unfitted to have any but a very subordinate charge of infants. I saw the other day a pretty idea expressed in a picture. Several small children were sliding and skating on a frozen sheet of water, where the ice was full of cracks and holes, and a guardian angel was keeping watch over the reckless group. This is an apt illustration of the perils of an infant under the uncontrolled management of a nurse. Let angels and ministers of grace defend it.

Were it only to enable them to supervise the work of a nurse, or to appreciate danger when it threatens, and know when medical assistance is required, mothers would do well to study the phases of infant life, and thoroughly familiarize themselves in the practical management of babies in health and disease. Is it possible for a woman to be devoted to her child, and yet

consistently show apathy and indifference in a subject which so nearly concerns its happiness and welfare? This is a domestic paradox which must every day confound the thinking practitioner—a mother doting on her child, yet complacently accepting her incompetence to minister to it efficiently, and content to transfer to a stranger, the duties which it ought to have been her own proud privilege to perform.

CHAPTER XXIII.

QUESTIONS RELATING TO THE SUCKLING OF INFANTS BY THEIR MOTHERS.

THE first difficulty which presents itself to a young mother, who has acquired for the first time the responsibilities of a parent, is that which relates to the feeding of her infant. Shall it be suckled or "brought up on the bottle"? How often should it be fed, and what quantity is to be given at each meal? If cow's milk be used, with what should it be diluted, and in what proportions? These are some of the questions which begin to perplex the maternal mind. The ancient autocrat of the lying-in chamber generally furnishes the answer. The omniscient type of nurse, whose talent and erudition are measured by the number and brilliancy of her previous exploits, as recorded by herself, meets these queries before they are spoken, by the infallible lesson contained in her example. Never a doubt nor shadow of diffidence disturbs the imperturbable equilibrium of this official's confidence in her own authority, and woe to the unfortunate, not excepting the doctor, who

conveys dissent, scepticism, or mild contradiction, by implication or feeblest utterance.

Though the art of feeding infants is coeval with man himself, and has been practised in all ages and climes, the finished female of the nineteenth century, in the zenith of educational advantages, perched high on the blue pinnacle of learning, knows nothing about it, and just when she most needs her knowledge, we find her supremely ignorant. A very little previous instruction and training would enable young women, with their natural quickness and intelligence, to fully comprehend the subject, and fit them for taking the control and direction of this department into their own hands, and keeping the nurse in her own subordinate place. But no such instruction is forthcoming. There is a singular taciturnity on the subject, and the authority of the infant commissariat is monopolized by old women and charlatans. The mother, while yearning to minister to her little one herself, and naturally jealous of interference in the sacred offices of motherhood, has yet no choice but surrender her privileges as the penalty of ignorance.

Most mothers are anxious to suckle their infants. One lady told me she would not be able to realize that her child was really her own, unless she performed this maternal office towards it. When, from any cause, we find it necessary

to order a child to be prematurely weaned, it almost invariably causes the poor young mother a pang of disappointment. The pride and pleasure which a woman takes in nursing her babe is pleasing to contemplate, and no medical man with any feeling would willingly or rightly rob her of that happiness without due consideration and a sense of urgent necessity. Exceptions to the rule there will always be; unnatural mothers, to whom the restraints imposed by nursing are irksome ties, who look upon the innocent babe as an exacting tyrant, whose legitimate sphere is the nursery, and whose devoted slave and victim should be the nurse, and not the mother; an inconvenient necessity in the economy of the universe, to be selfishly subordinated to her own convenience and pleasure.

Hereditary Disease disqualifies a Mother for Suckling.—The first question that must engage our consideration in deciding a woman's fitness or otherwise for performing the duties of nurse to her offspring is, whether she is the subject of any disease, weakness, or peculiarity of temperament, which it would be undesirable to perpetuate in her child. By the laws of natural inheritance, a child is more or less stamped at birth with the constitutional failings of its mother, which nursing serves in an eminent degree to strengthen and confirm. Consumption, scrofula, cancer, and other blood diseases,

as well as the long list of nervous complaints, such as epilepsy, hysteria, and mental weakness, are essentially hereditary affections. The only hope of counteracting the chances of transmission, and averting the fatal tendencies in the child, consists in prohibiting suckling and resorting to artificial feeding. The writer is acquainted with a family of seven children, whose mother was scrofulous. One died of consumption, another of Bright's disease of the kidneys, while four are always ailing. One only is in vigorous health, and, singular to say, she was the only one of the seven who was brought up on the bottle, the others being all suckled by the mother. This also illustrates another curious fact in the transmission of diseases, viz., that certain allied complaints are interchangeable by descent. Thus scrofula in the parent may assume the form of consumption in the child; intemperance in the father may produce epilepsy or mania in the son; epilepsy in the mother may cause water in the head in her infant, and infantile convulsions may frequently be traced to some irregular condition of the nervous system in one or both of the parents. One of the most protracted cases of convulsions I have met with, where the child periodically became attacked without apparent cause, was that of a child whose father was remarkable for the peculiar shape of his head, which bulged un-

naturally forward at the forehead, and who was subject to periodical attacks of headache. In all other respects he was a healthy man, with good physique and fine intelligence. The mother was perfectly healthy.

Excitable Mothers should not Suckle their Infants.—An excitable, nervous, or emotional temperament short of actual disease is sufficient to disqualify a mother for nursing. Nervous perturbations are apt to pervert the quality of the milk, as well as interfere with the regular function of secretion. The result of this is to make the child fretful and peevish, while at the same time, its food supply becomes irregular and capricious. Irritability of the nerves is well known to interfere with the process of nutrition, and the secretion of milk being an analogous process, requiring the same physiological conditions for its healthy fulfilment, it is equally prejudiced by nervous disturbances. Experienced nurses know very well that excitement, whether physical or emotional, invariably spoils the milk, and upsets the child's digestion, and they are careful not to let their charges, the young mothers, indulge in the gaieties of social life, or even walk too fast and heat themselves, endeavouring to coax them into that perfect equilibrium of mind and body, which they know from experience to be the best promoter of infant health and comfort, superior even to the

famous cordial of Winslow or the pulverized balm of Steedman.

Nursing Mothers should avoid Gaieties.—This brings me to the consideration of objections to nursing founded on social customs and observances. Many women are debarred from the repose and quiet so necessary to a nurse, by the necessities of social life, from which in many cases there is absolutely no escape. Dances, dinner parties, and other gaieties, are not adapted to nursing mothers, and where it is felt that these things cannot possibly be given up during the period of nursing, it is better to abandon all ideas of suckling, and decide at the outset to bring up the baby on the bottle.

Nursing should be abandoned if the Infant does not thrive.—Inferior quality of the milk is occasionally an obstacle to nursing. Instead of containing the nutritious ingredients in normal proportions, it becomes thin and watery, and utterly unfitted for nourishing the child. Some constitutional defect is always present to account for this imperfect condition of the lacteal secretion, and may be occasionally rectified by the administration of tonics, and a proper regulation of the diet. The effects on the baby of a thin condition of the milk are generally easily recognized, being those of general malnutrition. The child has an emaciated appearance, with a curious old expression in its

face, languidly moving its limbs, and uttering low feeble cries. There is also a great liability to attacks of diarrhœa and general indigestion.

Deficient secretion is another common obstacle to nursing. It may be suspected when the infant, though beginning his meal with eagerness and apparent hunger, turns away from it after sucking for a few minutes, with a cry of disappointment and peevish vexation, indicating an unsatisfied appetite. It however occasionally happens that, while milk is scarce and scanty during the early weeks, a more liberal flow is established as the patient gets stronger, takes more food and begins to move about.

Particulars of Feeding, as to frequency and quantity.—Assuming that the mother is qualified to suckle her infant, it is important for her to know how often it must be fed, whether there should be any restriction as to the quantity, and if so, how she is to know when the baby has had its prescribed allowance. These are apparently trifling details; but no one who has any experience with children will ever regard the minutest particulars connected with their feeding in any other light than as subjects of vital importance. It is from inattention to such apparent trifles as these, that the first departures from health often arise, the ulterior results of

which none can predict. It is in such trivial beginnings, that the seeds of disease are generally sown, which germinate, and with perverse fecundity, bring forth their hundred folds and thousand folds of baleful fruit.

For the first six weeks, an infant should be fed every two hours during the day, and every four hours during the night. Supposing it to have been fed at ten o'clock at night, the next meal need not be given till two in the morning. and the next after that not till six o'clock; the two hours interval being observed during all the other hours, from six in the morning till ten at night. There will be a great temptation to regard this rule as more honoured in the breach than in the observance; but let the mother strictly adhere to it, and her firmness will not miss its reward. There cannot be a more exacting or discriminating tyrant than a baby, when its guardian betrays weakness and a disposition to yield to its entreaties. It perceives its advantage with astonishing celerity, and is prompt to profit by it. It will demand food in imperious screams, whenever it pleases its fancy to beguile the waking hours by sucking; but let not the mother be awed into submission. It will supplicate in the most piteous wails; but the parent must be inexorable and resist compassion, for pity is akin to surrender. After one or two vain attempts to extort food,

the baffled despot will have had an early lesson in healthy discipline, and learn to forego the pleasures of indulgence. The chief person, however, who benefits by this arrangement, is the mother, who is thus secured four hours of uninterrupted rest, which would not be the case, if the periods of nocturnal suckling were left to be decided by the demands of that capricious little Mogul, the baby, who would use his power with the least possible consideration for his mother or nurse.

After the sixth week, the intervals between meals may be lengthened to three hours during the day and six hours at night. A baby's cries do not necessarily proceed from hunger, as some appear to imagine, who offer the baby food the moment it begins to cry, and often long before it cries, when the event is impending by signs of restlessness and ominous frowns. as if crying were a grievous calamity, to be prevented by all the maternal resources at command, of which the first and foremost is that which appeals to its ruling passion, voracity. Uneasiness often proceeds from overfeeding. A mass of curdled milk is perhaps lying undigested in the infant's stomach, or it is undergoing acid fermentation, causing flatulent colic —a state of matters little likely to be improved by further feeding. It is a curious fact, and one which is very misguiding to nurses, that

ravenousness is a frequent sign of indigestion. As a result of this, the more a baby cries, the more he is fed, and the thicker the sop, the greater are his cries.

With regard to the quantity to be allowed at each meal, it differs in different infants, some requiring considerably more than others. On an average, however, from two to six ounces will be required during the first six weeks, the quantity being gradually increased each week within these limits. It may be useful to remember that an ordinary sherry glass holds about two ounces, and that for all practical purposes it may be accepted as a correct measure. Children five or six months old will require from six to eight ounces at each meal; and at this age one drink at least must be given by hand, thickened with some of the preparations known as "infants' food," of which Mellin's is one of the best.

Babies at the breast have their meals regulated in quality, and, to a certain extent, in quantity, by Nature, but the food of the artificially-fed infant is an arbitrary concoction, and the greatest pains must be taken to assimilate it as nearly as possible to its perfect prototype —human milk. The chief point to be attended to with regard to quantity is, to be sure that the infant gets enough. If an infant six weeks old does not get more than an ounce and a half

at each meal, it will probably begin to show symptoms of slow starvation. Where food is given by the bottle, the quantity taken can be accurately ascertained. But in the case of breast-fed infants, we are dependent on their cries in order to discover whether or not the proper quantity has been taken. A healthy child usually takes the breast with avidity, and a sudden interruption to his enjoyment by failure of the milk supply, naturally annoys and disappoints him, and he gives vent to that peculiar cry of disappointed vexation, half peevish half passionate, so characteristic of short rations. Repletion usually finds its own remedy in rejection of the surplus, and infantile prodigality is seldom attended with worse consequences than sickness, if regular hours for feeding be strictly observed. It is the promiscuous feeding during the intervals that usually deranges the economy and brings about disorder. Occasional surfeiting is inevitable in breast-fed infants, but where the bottle is used it ought to be prevented, as the quantity of food in this case can be regulated with precision.

CHAPTER XXIV.

HAND-FEEDING OF INFANTS.

WE now come to the most difficult part of the subject, which deals with the hand-feeding of infants, as a substitute for suckling. Would that this were made the subject of instruction in female schools! How little is it understood by those who most require to understand it—the poor, who seldom have doctors or trained nurses to shield their babies from the consequences of their ignorance, who openly violate the cardinal laws of health and physiology, and expose their babes during the first twelve months of their lives to the seething waves of their untutored practice, in which on an average one-sixth of them founder, while five-sixths struggle ashore to the comparatively safe borderland of their second year of existence. Of all deaths which take place in this country, the greatest number are those of children under one year old. If we ask ourselves why this is so, the terrible answer faces us, because the ignorance of mothers—especially young and inexperienced ones, and of mothers among the

poorest classes, with none to guide them save the proverbial Providence, which tempers the wind to the shorn lamb—unfits them to cope with the difficulties attendant on infant rearing. In all my experience with the children of the poor, the diseases and disorders of infancy were almost invariably traceable to errors of diet, and in nine cases out of ten, when this had been set on a proper footing and their food strictly regulated as to quantity, quality, and frequency, these drooping ones at once began to revive. This in most cases constituted half the cure, the naturally good constitutions, which these little ones enjoy as a compensation for their other misfortunes, rendering the remaining treatment easy. Children reduced almost to skeletons, and apparently beyond all hope of recovery, will regain their wonted plumpness and vigour in a remarkably short time, when once their dieting is taken in hand and properly administered. Originally springing from dietetic errors and mismanagement, many diseases grow so rapidly, creeping from one phase to another, that no one would any longer recognize their origin, or trace them to their true source. Thus skin affections, wasting diseases, and disorders of the brain, may all arise from one common source—the stomach. This is only what might be expected in a being whose greatest business in life is to nourish its

body and grow. If the first step in the process of nutrition—the digestion of food in the stomach—be interrupted, it is reasonable to expect general disorder of the whole system to follow as an immediate consequence, and finally, failure of nutrition and growth. This is true as a general physiological fact, but especially so with reference to the rapid nutrition of infants.

Chief differences between Cow's and Woman's Milk, and the method of adapting the former for Infant Feeding.—In selecting a substitute for mother's milk, we must choose one that resembles, in composition and in the relative proportion of its component parts, as nearly as possible that which we propose to replace. The substance which bears the greatest likeness to human milk is the milk of the ass. But as this is a somewhat rare and expensive commodity, we are compelled to fall back on cow's milk, which ranks next to ass's milk in its resemblance to the human secretion, and to modify it to our standard, as revealed in the analysis of woman's milk. The chief differences between cow's and woman's milk are these :—The former contains less sugar and water, but more butter, casseine, and saline matters than human milk. In adapting cow's milk, therefore, as a food for infants, we must add water and sugar. But this is not all. The great difference lies in their relative capacities for curdling. Human milk is curdled

by rennet or gastric juice into numerous fine flocculi, while cow's milk is converted by the same agent into large, tough, gelatinous lumps, which defy the infant's digestion to dissolve. This is the chief discrepancy we have to reconcile in adapting cow's milk to infant digestions. There are two methods of overcoming this difficulty. One way is to mix the milk with some thin gelatinous substance such as barley water, which offers a mechanical impediment to coagulation *en masse*, while the other is a chemical process, and consists in neutralizing the acid contents of the stomach by the addition of an alkali, such as lime water, to the milk.

The independent existence which an infant acquires at birth marks an epoch in the life-history of the individual.

The physiological system undergoes a complete revolution. The hitherto functionless lungs, perfect in organisation though dormant in action, promptly responding to the call, open up their myriads of minute cells to the entrance of oxygen. The quiescent groups of respiratory muscles, stung to action by the tonic effect of cold air on a skin not used to low temperatures, now act in concert, and produce the heaving movements of breathing. The maternal dispensation is abolished and local autonomy is established. The organs of digestion are no longer to be idle members of the constitution.

They must be active labourers in the new commonwealth. While awaiting the maiden exercise of their functions, let us glance at the arrangements which are in contemplation for calling them forth. Butter and sugar is the prosaic compound which generally constitutes the first meal. A teaspoonful of ambrosia and nectar would have been a prettier sop for celebrating the genesis of eating and drinking. What can be expected of an infant which commences its alimentary career with such a repast? A system of feeding, inaugurated by butter and sugar, may be safely condemned before it be tried. An old ignorant nurse whose invariable practice had been to wait till the secretion of milk was fully established, before putting the infant to the breast, diverting the tender digestive organs in the meantime with alternate treats of butter and sugar, castor oil, and whisky punch, stood aghast and held up her hands in blank amazement, when a suggestion was made, to put the baby to the breast within a few hours of its birth. What a rich soil is ignorance for the growth and propagation of error! How often do I listen to statements, in which the greatest absurdities are uttered with all the gravity of truth. What, for instance, is the exact sense of suffering implied by the statement, that so-and-so is suffering from his *mucous membrane;* or what satisfaction to his

curiosity does a person get, who inquires as to the nature of his neighbour's ailment, and is informed that he is suffering from *inflammation?* It apparently conveys adequate and precise information to a layman, from the knowing nod and look of surprise that this communication produces in him, while to the obtuse medical man, it simply means nothing. Is it inflammation of bone, muscle, nerve, or brain? Is it inflammation of an organ or a limb, of the skin or serous membrane? A lady being told by a medical man that she was suffering from degeneration, brooded over her misfortune in unspoken misery, until she confided her troubles to another member of the profession, who restored her to cheerfulness by the ingenious explanation that hers was not a morbid condition, but a harmless mitigated form of degeneration incident to old age.

The practice of putting the child to the breast early is beneficial in more ways than one. It obviates the necessity of administering castor oil to the infant, it draws out the nipples, it moderates milk fever and produces healthy contraction of the uterus. Until the flow is thoroughly established, the precarious supply may be supplemented by milk and water. The early application of the child also promotes the secretion of milk, and produces less constitutional disturbance than when suckling is

deferred till a later period. The butter and sugar diet is the senseless invention of ignorant nurses, and ought to be strictly forbidden.

Diet of Infants during the first four Weeks.—To return to the subject of hand feeding, the following may be given to an infant for the first three or four weeks :—Two tablespoonfuls each of cow's milk, lime water, and plain water, sweetened with one teaspoonful of sugar of milk; or two tablespoonfuls of milk with four of barley water. Where there is a tendency to diarrhœa, the lime water will be found useful; while barley water is the best diluent for preventing sickness. If sickness should persist, a tablespoonful of fresh cream diluted in five tablespoonfuls of whey may be tried. If it be well borne, the proportion of pure milk may be increased to a half of the whole drink. The food must never be given cold. It should be warmed to about blood heat, by placing the bottle with its contents in hot water. Whey is prepared in the following manner :—Add three teaspoonfuls of pepsine wine to a quart of warm new milk, and set to stand inside the fender for two hours. Remove the firm curd by straining through muslin, and sweeten the whey with milk sugar. To prepare barley water, put two teaspoonfuls of washed pearl barley with a pint of cold water into a saucepan and boil slowly down to two-thirds. Strain. Instead of barley

water, gelatine prepared in the following way may be used :—Put a teaspoonful of gelatine into half a tumbler of cold water, and let it stand for three hours. Then turn the gelatine and water into a teacup ; stand this in a saucepan half full of water, and boil till the gelatine is dissolved. When cold this forms a jelly, of which a teaspoonful is to be added to half a bottleful of milk and water. Where the child is inclined to flatulent colic, carraway, dill or cinnamon water may be substituted for plain water. In cases where no form of milk appears to agree, Sir William Jenner's plan of using artificially digested milk may be tried. To each ounce of cow's milk add five grains of pure pepsine and four drops of dilute hydrochloric acid. Digest this in a water bath at a temperature of 100° Fahr. After a time the mixture becomes clear. Then neutralize the acid with bi-carbonate of soda, and the milk is ready for use. In extreme cases, where the infant appears unable to retain milk in any form, where sickness regularly comes on after taking it, in whatever way prepared or disguised, and the child is gradually losing flesh and strength, it must be withheld altogether for two or three days, and a diet substituted composed of equal parts of thin veal broth (½ lb. to the pint) and barley water. The effect is frequently marvellous, the sickness ceasing at once, and the train of dis-

tressing symptoms arising from practically slow starvation, speedily giving way to signs of returning strength and progressive nutrition. The foregoing recipes for feeding infants are furnished with a view to illustrate the immense resources of the physician in the direction of dieting, when once the true state of the infant's troubles is understood and appreciated. An infant, unlike an adult, is just as ready to respond, and to respond promptly, to well-directed treatment, as it is to droop and sink under neglect or unskilful management. There are some ailments of children which to-day may be successfully treated with the greatest ease, and to-morrow will pass beyond the power of human help.

Diet of Infants, one to four months old.—After the first three or four weeks, half-and-half of milk and water, or whatever other diluent used, may be given, the proportion being gradually increased, until between the third and fourth month, when undiluted milk may be used. It must be borne in mind, that the milk of commerce is by no means to be relied on as a pure article of uniform strength, and this must be considered when preparing it as a food for infants. The appearance and taste of the milk is a very fair guide to its quality, and adulteration may nearly always be detected without the help of any other test. After the third or

fourth month, one of the meals may be given thickened with some of the preparations sold under the name of "Infants' food."

We have already said that until the salivary secretion is established, the administration of farinaceous food to infants is irrational and improper, saliva being indispensable to the digestion of starchy compounds. It is, however, found that the addition of malt to farinaceous food produces artificially the same change in starch, which saliva excites in the process of digestion. The idea therefore occurred to Mialhe so early as 1845, that if a food could be prepared to contain malt in combination with starchy compounds, it could be safely administered to the youngest infant. The theory was not, however, successfully put into practice till fifteen years later, when Liebig produced his "food for infants," composed of wheat flour, malt, and carbonate of potash, and this has been the model after which all the numerous infants' food of more recent years have been prepared.

The Use of Swiss Milk.—When cow's milk appears to disagree, Swiss milk may be tried, and will very often prove an agreeable and efficient substitute. Most children, in fact, thrive so well on Swiss milk that parents are tempted to abandon cow's milk altogether in favour of it. Nurses especially are loud in its praises, on ac-

count of the peaceful nights they enjoy, as a result of its use, in comparison with the incessant sickness and colicky screams, which disturb their slumbers when cow's milk disagrees. The large amount of sugar used for preserving the Swiss milk has a fattening effect, though as a flesh-forming food, it ranks very inferior to the fresh milk of the cow. As a temporary substitute for it, however, and to afford rest to an irritable stomach, it is very well adapted. Preserved milk is to fresh milk what tinned meat is to the fresh article, and though perfectly suitable as occasional foods, neither Swiss milk nor preserved meats are proper articles of diet for daily use.

A gentleman, who combated my opinion that Swiss milk was not adapted as a permanent food for children, gave an instance of several children of his acquaintance who were brought up entirely on Swiss milk, and were, he stated, "the pictures of health." The stamina of children, however, are not to be judged by their appearance in health, but by their powers of endurance when ill, and by their capacity to resist the inroads of acute disease. A child fattened on Swiss milk will, under the influence of exhausting diseases, such as diarrhœa or pulmonary affections, lose strength and emaciate far more rapidly than one who has been built up on fresh milk.

Sudden changes of Diet must not be made while Infants are Teething.—As the child continues to grow, and the eruption of the teeth indicates that he is being prepared for food of a more solid character, the question of weaning must engage our attention. The process of teething is beset with trouble and danger, and our care of the infant should be increased tenfold while it is passing through this critical period. The local irritation produced by the tooth pushing its way through the gum, is conveyed by sympathy of nerves to remote parts, such as the brain and intestines. Diarrhœa is a frequent accompaniment of teething, and convulsions are not uncommon. Even the skin will sympathize, and break out in alarming eruptions, which disappear again as soon as dentition is complete and the source of irritation allayed. A child's temper is not of the sweetest during teething, but he is not cross from disposition, but by reflex necessity. He can no more help being peevish than he can resist closing his eyes when sleep overtakes him, or starting when suddenly alarmed.

The period of dentition is therefore a critical time for infants, and every possible source of irritation must be carefully avoided until the teeth are cut. It would be highly improper to make any violent change in the food while the child is saddled with the troubles of dentition.

We must wait at any rate till the first few teeth are cut, and the violence of the storm has somewhat abated, so to speak, before entering on a more solid diet.

The Order of Eruption in Teething.—The first tooth is generally cut when the child is about seven months old, but some scrofulous children will begin teething as early as the fourth month. The author is acquainted with the mother of a large family of children, who used to boast that all her children had their first teeth before they were four months old, attributing the phenomenon to superior constitutional qualities. In ricketty children, on the other hand, teething is often delayed till the eighteenth or twenty-fourth month.

The first teeth which make their appearance are generally the front ones of the lower jaw, called *lower incisors.* These are followed, after a brief interval, by those of the upper jaw, called *upper incisors.* This completes the eruption of the four *central incisors.* These are again followed, after an interval of four to six weeks, by the *lateral incisors*, the upper ones usually appearing first. At the twelfth or fourteenth month, the first double teeth are usually cut, those of the under jaw taking precedence. The *eye teeth*, or canines, of which there are altogether four, two in each jaw, are cut between the sixteenth and twentieth month, and gener-

ally cause a good deal of disturbance. It is popularly supposed that the upper eye teeth have an intimate nervous connection with the eyes, but this is a notion which has no foundation whatever on fact. Last of all, the back double teeth or molars pass through the gum between the twentieth and thirtieth month, making in all twenty teeth, viz., four each of central incisors, lateral incisors, canines, anterior molars, and posterior molars. The full set of adult or permanent teeth consist of thirty-two, there being three additional sets of grinders, including the wisdom teeth, the other teeth being similar to those of the temporary set.

Simple Precautions during Teething.—The principal things to be attended to during teething are to guard against cold, to attend carefully to the bowels, and to regulate the diet. When the gum is red and swollen, it may be necessary to have it lanced ; but a judiciously administered laxative is often a more agreeable and effective way of helping the tooth through. A crust of bread, or an india-rubber ring, is serviceable during teething, and the writer knows of a lady, who, in treating her own children, regularly employed a thimble to grind down the gum stretched over the point of a cutting tooth. There is no more ingenious person than a mother, when she is planning methods of treat-

ment for her children. The necessities of her offspring suggest to her ways and means, from which even a member of the faculty might profit. The affection of a mother for her offspring sharpens all her faculties to discover its wants and understand its troubles, in a way which often not even doctors can rival. Who can interpret so well those inarticulate cries, every tone of which conveys a distinct sensation, as the quick, intelligent woman who watches her child day and night with a devotion that knows no fatigue, with the fondness that knows no selfishness. Unlearned in the deep mysteries of the healing art, or the technicalities of medical science, she is yet able to minister successfully to her infant in many of its trials by an art of her own—an art in which we may profitably imitate her—the art of close observation, and of throwing into our studies and pursuits that deep interest, that earnestness which is ever the true secret of success.

Regulation of the diet, however, is only one of the difficulties which the young mother is destined to encounter.

CHAPTER XXV.

THE BABY'S CRIES, AND WHAT THEY MEAN.

BEFORE the baby is many days old, it will probably give utterance to some of those screams, which are distressing to hear, difficult to appease, and perplexing to understand. Imagine a young mother, suddenly assailed by piercing cries from the little infant she worships, baffled in all her attempts to soothe it, and almost at her wit's end to guess at the cause of its trouble. Can he be hungry! The great panacea for infantile woes, the bottle or the breast, is proffered, but the child turns away from it with a gesture of impatience, and screams the louder. In vain does the mother caress and implore it in the tenderest epithets to desist, her appeals only serving to add passion to its cries. An infant is essentially an animal, utterly dead to sentiment, and obeying only the dictates of its physical organisation. Those fine appeals, therefore, of its guardian, couched in the sweetest tones, and the most endearing phrases, are utterly thrown away upon him. The one business which absorbs him is the harmonious transaction

of nutrition and growth, its voluntary contributions to which consist in drinking and sleeping. When anything happens to interfere with this important business, or to mar the harmony of its operation, the infant is endowed with a means of protest, which no person, who is not altogether bereft of feeling, can afford to despise.

Flatulence.—One of the commonest causes of such fits of crying is abdominal pain from flatulent colic, to which most children are more or less subject. Decomposition of undigested milk gives rise to gas, which distends the intestines, and produces spasms of their muscular fibres. When an infant is seized with a fit of crying difficult to pacify, flatulent colic, or, to use a more homely term, "wind," should be suspected, and the first thing to do is to ascertain whether this is the cause. There is no difficulty whatever in doing this. Abdominal pain is always characterised by the cry being low and prolonged, by the peculiar drawing up of the upper lip, and by the active movements of the legs during a paroxysm. Flatulent colic is ascertained beyond doubt by percussing the abdomen, which yields a drum-like note, when distended with gas. To perform percussion, the middle finger of the left hand is laid flat on the abdomen, and with the *point* of the middle finger of the right hand, tapping

movements are performed, the finger striking not the abdomen, but the finger of the other hand placed on it. Although percussion is strictly a professional operation requiring delicacy of touch and much practice, it may be easily practised by amateurs for the purpose of detecting flatulence.

The best remedy for an attack of flatulent colic is a few drops of salvolatile, which is very effective. Ten or fifteen drops may be given to the youngest infant well diluted in warm milk and sweetened with sugar.

Head Affections.—If the cry be sharp, short, or sudden, and especially if this symptom be accompanied by contraction of the brows, pain in the head is indicated. The brain troubles of infants, especially those of an acute inflammatory character, are generally accompanied by sickness and obstinate constipation.

The sickness referable to brain disorder is different from that which occurs as a symptom of indigestion. There seems to be no nausea or retching associated with it. The food is ejected with great force from the stomach, without the slightest exertion or apparent disturbance. The term *cerebral vomiting* is used to indicate this characteristic symptom of head affections. If therefore a mother observes these collective symptoms, she has just cause for alarm, and being aware of their grave import,

she will lose no time in placing the infant under properly qualified treatment. Where, however, medical assistance is not procurable, or where the immediate attendance of a doctor is impossible, a strong purgative may be administered. A dose of jalap or castor oil is a very serviceable remedy in such cases, and it would be perfectly justifiable for a mother under the circumstances to gain valuable time by administering it on her own responsibility. No right thinking medical man would ever be jealous of lay interference in such a case, if his treament were correctly and intelligently anticipated. I knew a courteous old physician, who always endeavoured to applaud amateur doctoring by emphatically remarking that the treatment was exactly what he would have employed himself; a compliment which never failed to give satisfaction, and to raise him in the estimation of its flattered recipients. Attempts on the part of friends to give relief to the sick or wounded are made less with a view to self-glorification, than with a genuine wish to be useful to them; it is not presumption, but true sympathy that actuates them. This being generally so, it seems churlish on the part of the doctor to be too critical or captious, and not to pass over lightly the little blunders of friendly and humane zeal.

Another symptom of pain in the head, and one worth knowing, is a peculiar movement of

the arms, as if the infant were beating the air. It is perhaps not generally known that very young infants are subject to earache. This is a fact, the discovery of which I owe to the keen-witted sagacity of a young mother. Her child had a fit of crying, which nothing seemed to appease. I satisfied myself that there was no colic to account for it. There was nothing to indicate brain or lung trouble, and the clothing was carefully searched, in case a pin might have been hurting the child ; but nothing was found, and still the screaming continued. At last, the mother became convinced that the child was suffering from earache. I was inclined to ridicule the idea, but only too glad of a new suggestion, I soaked a pledget of cotton wool in a mixture of olive oil and laudanum, warmed over a spirit lamp, and introduced it in the ear indicated by the mother. In a few minutes the crying ceased, and the child dropped off into a sound sleep. I have since observed that the symptoms referred to occasionally pointed to earache, the affected ear being indicated by the motion being confined to the arm of the same side. In case of doubt, if all other sources of pain have been reasonably excluded, the matter may be decided by the adoption of the treatment indicated, which effectually allays the piercing pain of earache.

Bronchitis and Lung Inflammation.—Pain in the chest is indicated by sharp curling of the nostrils. The diseases which cause such pain are usually bronchitis, and inflammation of the lung. Ordinary catarrhs are very liable, in infants, to glide into these fatal complaints, and too much care can never be bestowed on children when they are suffering from colds, especially children whose parents are of bronchitic or consumptive tendencies. Any weakness or delicacy of the lungs, in fact, such as asthma or emphysema, in either of the parents, should make us specially careful to guard against neglecting ordinary colds in the children.

In bronchitis, the inflammation is confined to the larger bronchial tubes. The three important symptoms are fever, pain in the chest, and cough. The most important, however, is fever. I should be glad to see clinical thermometers in general use among mothers. They are convenient little instruments for ascertaining the precise degree of fever present. The mode of using them is very simple, and the amount of information gained by their means is of vital importance to the infants, as well as their guardians. For example, if the thermometer persistently registers a temperature of 101° or 102° in a case of cold with cough, it is almost a certainty that bronchitis has set in. We are enabled, by

the daily use of the thermometer, to detect the most insidious approaches of inflammatory complications in the course of a disease. Increase of temperature, or, in other words, fever, indicates the presence of inflammation, and the difference between an ordinary catarrh, and a cold complicated with inflamed bronchial tubes, is too evident to indicate the importance of any means which enables us, with certainty, to distinguish one from the other.

If the mother would further apply her ear close against the child's back, she would hear certain wheezing and cooing sounds, as if air were struggling to pass through abnormally contracted apertures. These are confirmatory evidences of bronchitis, and may be heard in the manner indicated without the aid of the stethoscope. In bad cases the nostrils of the infant will be observed to be in rapid motion, as if breathing were being conducted with difficulty, and maintained by special efforts on the part of the little sufferer. The bulk of the lungs in infants is located in the back, and more information is therefore gained by sounding the regions between and below the shoulder-blades than the chest.

The treatment of bronchitis consists in the local application of linseed poultices round the chest and back, mild aperients, moderated diet

and the administration of a few drops of ipecacuanha wine in some saline mixture, such as minderus spirit or sweet spirits of nitre and water, every three hours. If the fever run very high, and if the infant be robust and full-blooded, two or three drops of antimonial wine may be added to each dose of the mixture. In suitable cases this is a remedy of great power. It will rapidly subdue the fever and control the inflammation, but must be administered with the greatest caution, as weakly infants will become prostrated to an alarming degree under apparently trifling doses, and if it be not discontinued in such cases, fatal results will quickly follow.

Bronchitis is a serious enough complaint, but if the inflammation extends from the bronchial tubes to the cellular substance of the lung, the case acquires a much graver aspect. Unfortunately it is but a little step from one to the other, especially when no prompt and decisive treatment is interposed to prevent the calamity. If the transition from bronchitis to *pneumonia* or inflammation of the lung is easy, the treatment of bronchitis and the limitation of inflammation to the bronchial tubes is also easily accomplished, if proper remedial measures be adopted in time. The treatment of such a grave affection must not be undertaken, however, by amateurs. It should be conducted by

one who thoroughly appreciates the various circumstances connected with the particular case before him, using sedatives, stimulants, or alteratives as the case demands, or according to the stage in which the disease is found. If the child lies still, with its cheeks flushed and its nostrils sharply curved and moving rapidly, the probability is that the lung has become implicated.

The Fontanelle as an Indicator of Disease.—It is useful for mothers to observe the condition of the fontanelle in infants, as important information is thereby gained in health and disease. Children are born with four unclosed spaces in the skull, called fontanelles. These spaces or intervals become gradually closed as the child grows older, and as the bones of the skull complete their growth. They are called *fontanelles*, on account of the pulsations of the arteries of the brain, which are distinctly perceptible through the skin and membranes covering them. The pulsations were supposed to be like the rising up of water in a fountain, and hence the term *fontanelles*. The anterior fontanelle lies just above the forehead, on the top or vertex of the head, and is the one usually selected for observation. It closes up usually between the first and second year. If the fontanelle be depressed, exhaustion is indicated, and no time should be lost in administering

stimulants. After severe diarrhœa or chronic vomiting, the fontanelle will often be found depressed, and brandy and port wine in suitable doses must be immediately resorted to. In inflammatory conditions of the brain the pulsations become exaggerated, while the covering membranes are tense and prominent. In hydrocephalus, or water in the head, the fontanelle is more open, and often, but not always, elevated, while in rickets it is depressed from thickening of the boundary bones.

The foregoing remarks on babies are not intended by any means to cover even scantily the wide subject of their management in health and disease; but the writer has selected certain points from that illimitable field, which his experience has taught him to regard as the most important, from a practical point of view. In treating of these subjects, moreover, it has been his aim to make the teaching suggestive rather than formulary. Nothing has been brought forward which does not daily engage the attention of nurses and mothers, and yet the object aimed at has been to stimulate curiosity and desire for knowledge on a broader basis than hard and fast rules and domestic empiricism.

CHAPTER XXVI.

FOOD.

FOOD may be compared to music. However rich in harmony and variety a musical composition may be, the original or elementary notes of which it is made up are few and simple. Similarly, in the case of food, however fine the composition, however delectable the combinations, the component ingredients are common elements of chemistry. The most exquisite and *recherché* dish, the finest and costliest fruit, and the most delicate viands, are simply carbon, hydrogen, oxygen, nitrogen, and minerals. The melody, so to speak, of a Scotch peasant's meal, consisting entirely of oatmeal, is picked out of the same octave as supplies the materials for the brilliant fantasia of one of our modern fashionable dinners.

Classification of Foods.—The elementary substances to which all kinds of food are reducible, are carbon, hydrogen, oxygen, nitrogen, and certain minerals. These are the elements of which the human body is composed. These are the elements which are thrown out as waste

from the body. These are therefore the elements we expect to find in food, which is nothing more nor less than the material which maintains life in its various conditions.

This, however, is too elementary a classification for physiological purposes, and that which is usually adopted is the following, which advances one step further than the primary elements of chemistry:—(1) Proteids, (2) fats, (3) amyloids, (4) minerals.

Proteids.—By proteids we mean all such substances as the lean of meat, white of eggs, gelatine, and the cassein or curdling element of milk. Peas and beans, and other leguminous seeds, and the gluten of flour, also furnish proteids. White of eggs is generally accepted as the type of this class of food. We therefore often hear the latter spoken of as the albuminous class. It is also called nitrogenous food, owing to the nitrogen it contains. The chief function of the proteids is to repair the tissues. The kidneys are constantly eliminating nitrogen. Something like 300 grains are daily removed from the body through this channel principally, and if food containing nitrogen be not supplied, the tissues of the body will gradually waste away until death takes place. Meat is the most abundant and convenient source of nitrogen, but many vegetable substances, such as oatmeal, beans, peas, &c., are comparatively

rich in this element. In order to extract his daily need of nitrogen from oatmeal, a man would require to consume two and a quarter pounds of it. But this again would burden him with 2300 grains of carbon more than his requirements. Oatmeal alone, as a food, would therefore prove too bulky in substance for the stomach, and far too heating to the blood, the combination of the extra carbon with the inhaled oxygen producing too intense combustion. If it fail to have this effect, one of two things must needs occur. Either the extra carbon would be stored up as fat and produce undue obesity, or violent indigestion, accompanied by sickness and diarrhœa, would inevitably follow. Instinct therefore guides those whose staple article of food is oatmeal, to find the balance of nitrogen in milk, eggs, or fish. Similarly, it would take about three and a half pounds of bread to obtain the necessary amount of nitrogen, whereas, by adding milk or cheese to the diet, a considerably less amount of bread would suffice.

Fats.—The next class of food is that which embraces all kinds of fatty substances, such as animal fat, butter, oils, as well as vegetable fats. they are rich in carbon, and their chief function in the economy is to produce heat. Hence, fatty articles of food are largely eaten and well tolerated in Arctic regions, where the inhabit-

ants devour the blubber of seals with an avidity that astonishes the natives of southern climates.

Amyloids.—The Amyloid group includes saccharine substances, dextrine, gum, and all the various kinds of starchy food, which undergo conversion into grape sugar by the process of digestion, previously to being absorbed into the blood. Rice, potatoes, corn flour, sago, arrowroot, &c., belong to this class. They are rich in carbon, like the fats, and like them they are mostly, if not wholly, heat producers, and play a very minor part as tissue formers.

Minerals.—The fourth class, or minerals, include water and the various metallic and saline substances, such as iron, sulphur, potash, soda, lime, magnesia, &c.

CHAPTER XXVII.

DIGESTION.

THE living body, as everyone knows, is not a stable fabric, but constantly under the operation of the two factors, decay and renewal. There can be no expenditure of force which is not made at the cost of tissue. Every movement we make, every word we utter, every turn of the eye, every breath, every smile, costs us so many elementary tissue cells. The losses thus incurred are made good by the blood which feeds, builds up, or repairs the tissues. The blood is a complex fluid, and holds in solution the various kinds of food which the different parts of the body require. The bones require lime, the brain phosphorus, and the muscles nitrogen. The blood possesses all these substances for their due nourishment; and how is it that each kind of tissue appropriates its specific food, making the selection with unerring precision? How is it that the nourishment destined for the brain is not deposited in the bones, or that the food of the muscles is not carried away to the brain? Materialists will

probably refer the phenomenon to some complex laws of physiology or chemistry, not yet properly understood, and they are right; but these laws are the means or engines, precise and mechanical in their operations, by which a supreme intelligence and wisdom provides for the contingencies of life. However elaborate and beautiful a steam engine may be, however well adapted to its work, however unerring and precise in its action, he must be a very superficial or childish person, whose admiration of its various parts is confined to the apparatus; whose thoughts do not naturally revert from the engine, to the engineer who constructed it, from the dumb mechanical structure to the ingenious thinking mind that conceived it. Similarly the contemplation of the human engine with all its fine adaptations should elevate every right thinking person's thoughts from "Nature to Nature's God."

In order that food may be absorbed into the circulation, and replenish the blood by becoming incorporated with it, it must fulfil certain conditions. A piece of solid meat, for instance, cannot gain entrance into the circulation and associate with the blood, without being first broken up and otherwise prepared for its reception there. In the first place, the transition from the alimentary canal into the blood vessels is effected through delicate animal membranes,

and one of the most important conditions, therefore, of absorption is, that the food must be reduced to a high degree of solubility, and rendered capable of passing readily through animal membranes. Moreover, the food must be chemically transformed, in order to render it assimilable with the blood.

The conversion of food into blood involves, therefore, first the process of comminution and chemical action, or in other words, digestion, and secondly that of absorption.

Mastication.—Comminution, or the breaking up of food into minute particles, is performed by the teeth, and is by no means an unimportant detail of the digestive process. If we wish to dissolve any substance such as a salt, we can do so more readily by previously grinding it into a fine powder. Similarly, the solvent action of gastric juice operates more readily on the particles of food, when they are reduced by proper mastication into minute fragments. Bolting of food is therefore to be carefully avoided, as it prolongs unnecessarily the act of digestion, entails greater labour on the organs, and not infrequently produces disorder and derangement from simple failure of the gastric juice to penetrate the unreduced masses of food. Let business men and others, who are frequently in the habit of hastily swallowing their meals, and hurrying away to work or other occupa-

tions, pause and reflect on the ultimate results of their thoughtlessness. The organs of digestion which are repeatedly taxed beyond their strength, will finally break down, and doom the unfortunate owner to the ineffable miseries of confirmed dyspepsia. The most unfortunate feature of physiological justice is, that punishment does not immediately follow the offence ; that Nature is not like touchwood and tinder, ready to resent her wrongs; but too forbearing and long-suffering. The intemperate man, the voluptuary, as well as the rash and thoughtless, whose constitutions are finally shattered and ruined, are not punished at the commencement of their evil careers. If they were, many would be driven back by the lash, many would pause to reflect, many would be reclaimed. On the contrary, the avenues of vice are resplendent with false jewels, and teem with apparitions of virtue, which lull the victim's fears and urge him on to ruin. Nature is patient and long-suffering, but when the final limits of her forbearance are passed, nothing is so awfully certain, nothing so unpitying and inexorable, as the punishment that awaits the offender.

The Teeth.—Another cause of imperfect mastication is referable to the state of the teeth. Decayed teeth are unfortunately an almost universal heritage of civilized races. Even children of tender years are not exempt from

the affliction, and nothing is more melancholy than the sight of otherwise healthy little boys and girls, with their milk teeth all blackened and excavated with decay, holding their hands to their face, and whimpering with the agonies of toothache. As for adults, it is hardly an exaggeration of the truth to say, that not one in a thousand can boast of a perfectly sound set of teeth. The very fact of dentistry being such an important and flourishing profession, is evidence of the great prevalence of the evil to which we refer. The cause of all this is as yet a matter of pure speculation and conjecture. It is however a remarkable fact, that among Eastern races, who eat little or no meat, and whose diet chiefly consists of vegetable substances, decayed teeth are the exception and not the rule. It is also a fact, that Orientalists devote a great deal more time and care to their masticatory organs than their more refined Western brethren. The Hindoo, whose teeth would compete even with the poet's description :—

> " Delicate little pearl-white wedges,
> All transparent at the edges."

spends full half-an-hour at the water's edge, industriously plying his rude toothbrush, which he has constructed out of the root of some wild plant growing hard by, one end of which he has hammered out into a fibrous brush by means of

a stone. The Cinghalese, whose ivories are not less covetable, provides himself with a lump of charcoal from the hearth, before leaving his hut in the morning, and repairing to the nearest brook, dips his charcoal in water and rubs it down against a stone. With this toothpaste he cleans his molars, using his forefinger as a substitute for the toothbrush. There is nothing these Easterns regard with greater abhorrence than omission of this sacred duty, and no amount of persuasion would induce them to taste food before it was duly performed. Toothache is unknown among them, excepting in the case of those who have long been servants in European families, and have acquired the tastes and habits of their employers.

Although the causes of decayed teeth are comparatively obscure, it is certain that the accumulation of shreds of food, especially animal and saccharine food, in the interstices of the teeth, is an important factor in favouring the disease, by giving rise to decomposition and acid fermentation. It is a wise precaution therefore to rinse the mouth carefully after each meal, and get rid of the particles which lodge between the teeth.

The operation of cleaning the teeth should never be omitted at the morning ablutions. The choice of a tooth powder is also of some importance. The essential qualities of a den-

tifrice are, that it should be free from grit, and that it contain an alkali. Gritty powders are apt to injure both the enamel of the teeth and the gums, while the presence of the alkali serves to neutralize the acidity of the mouth, caused by fermentation of particles of food in the interstices of the teeth. Light carbonate of magnesia is an excellent safe and cheap dentifrice, free from grit and eminently ant-acid. Camphor forms an ingredient in most dentifrices, being fragrant and stimulating; but there seems to be a prejudice against it, on account of its supposed injurious property of rendering the teeth brittle. I have asked the opinion of one or two eminent dentists on this subject. They were inclined to negative the impression, without however expressing any decided opinion.

Medicines, in which steel forms an ingredient, are also injurious to the teeth; but far greater damage is inflicted by the use of acids, especially mineral acids, and it is usual to take such medicines through straws, to prevent their contact with the teeth. Such acts of folly as attempting to crack nuts with the teeth are too obvious to need more than a passing allusion. Every wise person therefore will look to his teeth, and use every precaution to counteract the unfortunate tendency to disease and decay, which, as a civilized being, clings to him.

Digestion commences in the Mouth.—The next process of digestion is chemical action. The first step in this process takes place in the mouth. Starchy food, such as potatoes and farinaceous articles, is one of the most insoluble substances, and incapable of absorption in its natural state, for no starch can penetrate an animal membrane. Nature has therefore to contrive some means of overcoming this difficulty. Sugar is an extremely soluble substance and readily passes through animal membranes, and starch is converted in the mouth to dextrine or grape sugar, by the chemical action of the saliva. A substance called *ptyalin*, an ingredient of the saliva, acts as a ferment on the starch cells, converting them into grape sugar, and thus by a simple provision, one of the most insoluble substances is utilized into a highly digestible food. The digestion of starchy foods is not conducted at all in the stomach. On the contrary, the acidity of the gastric juice is fatal to the conversion of starch into sugar.

A Peep into a Living Stomach.—The food having arrived at the stomach, is acted upon by the gastric juice. What is the gastric juice, of which we hear so much? The answer to this question has been much facilitated by an accident which befel a young Canadian, named Alexis St Martin, in the year 1822. He received a gunshot injury in the stomach, which

left an opening in that organ, through which observations were made by Dr Beaumont on the peculiar process of digestion. Having fed his patient on various articles of food, Dr Beaumont peeped through this opening and watched the operation of the gastric juice on the various articles of food as they arrived, witnessing the act of digestion as it actually takes place in the living stomach. Dr Beaumont has drawn up a table showing the exact time required for the digestion of the various articles of food in ordinary use, based on observations of St Martin's stomach. The following is an extract from this interesting scientific diary:—

"April 7th, 8 A.M. St Martin breakfasted on three hard-boiled eggs, pancakes and coffee. At half-past eight o'clock, Dr Beaumont examined the stomach, and found a heterogeneous mixture of the several articles slightly digested. . . . At a quarter-past ten no part of the breakfast remained in the stomach."

According to Dr Beaumont's table we find that rice and tripe take first rank as regards digestibility, both of which articles of food were rendered soluble in one hour. Next in the order of merit come eggs, salmon, trout, apples, and venison, which occupied an hour and a half in digesting. Tapioca, barley, milk, liver, and fish took two hours; turkey, lamb, potatoes, pig, two hours and a half; beef and

mutton, from three to three and a half hours; fowls were like mutton in their degree of digestibility, and the most indigestible substance of all was found to be veal.

Hitherto there had been great difficulty in obtaining samples of gastric juice for scientific investigation. Now, however, Dr Beaumont had only to stimulate the man St Martin's stomach with a mouthful of savoury meat, and ladle out the gastric juice as it bedewed the glandular lining of this extraordinary stomach. Nature did not, apparently, shrink from the gaze of unhallowed scientific eyes, peering through the unnatural chink; but placidly conducted her mysterious operations, hitherto veiled from mortal view. With this living fountain of gastric juice, the men of science ought to have been happy. What an unexpected treasure suddenly placed before them! No astronomer could be happier as he gazed at the heavens through a telescope, than the enthusiastic physiologists, prying through the uncanny window, at the churning operations going on in the interior of the stomach.

The two principal ingredients of the gastric juice are hydrochloric acid and pepsine. Besides these important constituents, it contains water, a few saline matters, and a trace of iron.

Digestion in the Stomach—the Gastric Juice.—By the combined action of the acid and

pepsine, proteid substances are rent asunder, all their ultimate connections being severed, and the tissues reduced to a state of extreme solubility. In this condition it acquires the name of peptone, readily passes through the walls of the blood vessels, and is taken up into the circulation. The action of pepsine is that of a ferment, and the combined chemical action exerted by it and the acid is sufficient to break down the toughest meat. Before going further, let us examine a little more closely the properties of the gastric juice, and the conditions necessary for its healthy action on food, as without a careful study of this subject we can neither know what indigestion is, nor effectually treat the disease, which is at once the easiest and the most difficult of cure.

The internal surface of the stomach is studded with numerous minute glands or cavities, in which the gastric juice is stored or secreted. When food enters the stomach, these glands immediately acquire great activity, and the surface is covered with beads of gastric juice, which run together and pour down the walls of the stomach and soak into the food. Not only food, but any foreign substance introduced into the stomach, acts as a stimulus to the secretion of gastric juice. The quantity daily secreted in a healthy adult is said to range from ten to twenty pints.

Perversion of Gastric Juice.—We have already considered the composition of gastric juice in health. In certain diseases, however, the quality of this secretion becomes perverted. In some cases of blood-poisoning, for instance, and in diabetes, ammonia and sugar have respectively been detected in the juices of the stomach. In these cases it is also noticed that instead of being intermittent and dependent on a stimulus, the secretion is continuous and voluntary.

Excess of Gastric Juice.—Departures from the healthy standard are also observed in respect of quantity. Excessive secretion may be caused by undue stimulation. Alcohol and all kinds of stimulating condiments are capable of inducing hypersecretion. Inflammatory conditions and certain nervous influences have a similar effect. A curious example of excessive secretion is furnished in the well-known complaint, which goes by the name of *water-brash.* It may be occasionally caused by the irritation of particular articles of food or drink, but it is essentially a complaint of nervous origin.

Diminution of Gastric Juice.—Arrest or diminution of the secretion of gastric juice is almost invariably the result of adverse nervous influence. Depressing emotions, physical, mental, or nervous exhaustion, and weakening diseases, especially those affecting the nervous centres, all tend to retard the flow of gastric juice.

Bread eaten in sorrow lies like a load in the stomach, and the meal hastily swallowed by persons under the influence of fear or anger, is consigned to an organ ill-fitted for its reception, whose lining membrane, like the proverbial tongue that cleaves to the roof of the mouth, is sapless and parched.

Appearances of the Tongue.—The tongue is a faithful index to the state of stomach. When it is rosy and moist, we know that the gastric mucous membrane is healthy; when the tongue is furred and discoloured, we may infer that the secreting surface of the stomach is deranged; when the tongue is brown and dry, we are justified in concluding that nervous power is at its lowest ebb, and the gastric juice is greatly diminished, if not entirely arrested. Hence, the importance of examining the state of the tongue when treating disease. During my early noviciate in medical practice, I justly incurred the censure of an old lady whom I was attending, because I neither asked to see her tongue nor deigned to feel her pulse. In after years I corrected my error of omission with so much effect, that when I visited a certain house, whether professionally or socially, the children all rushed to me with their tongues out for medical inspection—like fledglings in a nest, gaping for food on the approach of the maternal bird.

In order that gastric juice may effectively operate on food, the following conditions must be fulfilled. (1.) There must be a temperature of 100° F. (2.) The food must be in constant motion, so as to bring every portion of it within the influence of the gastric juice. (3.) The digested portions must be immediately removed, so as to bring the undigested parts more completely into contact with the solvent fluid. (4.) The food must be reduced to a state of softness and minute division. All these conditions are complied with in healthy digestion. The normal temperature of the stomach is about 100° F., which is the temperature of the blood. If the temperature falls below this, as in nervous collapse or shock; or if it rises above, as in fevers, the gastric secretion is perverted, and attempts to digest any but the lightest food under such conditions will be certainly followed by derangement of the stomach. It is therefore an error to force solid food on fever patients, or patients suffering from any kind of inflammatory disease. The loathing of food, invariably observed in these cases, is Nature's mode of guarding against the indigestion of solid food in acute disease, and should be recognised as such by those who attend the sick. Similarly, when a patient is suffering from collapse or shock, consequent on a sudden fright or fall, it is an obvious violation of physiological laws to attempt to revive him with food.

The food must be in constant motion. This condition is fulfilled by means of the several sets of muscles with which the stomach is endowed. These muscular fibres encircle the stomach, are stretched across it transversely and obliquely, and enable the food to be rolled about in all directions, so that every part of it is brought under the influence of the secreting surface. We must, however, remember that the muscles of the stomach share to some extent the condition of the general muscular system. It is not reasonable to suppose that the gastric muscles will continue healthy and strong if the muscles in other parts of the body are relaxed and flabby. If by leading a sedentary life, and otherwise neglecting the rules of health, we induce loss of tone in the general muscular system, we must expect that part of it which supplies the stomach to be implicated in the general deterioration, as it presents no structural difference from ordinary muscular fibre, is nourished by the same components of the blood, and is subject to the same laws and conditions as the muscles in other parts of the body. It is true that there are two kinds of muscles, the voluntary muscles, which are under the control of the will, and the involuntary, which are independent of volition; but chemically there is no difference between them, each kind deriving its essential qualities

from the fibrinous substance *syntonin*, common to both. We can therefore understand chronic and intractable forms of indigestion springing from, or at any rate kept up by a loss of tone in the general muscular system.

The digested portions must be immediately removed. This condition is fulfilled by the activity of the circulation, the peptones entering the blood vessels of the stomach, and being carried into the blood current as soon as they are rendered capable of passing through animal membranes. The last condition, viz., the subdivision and comminution of the food, we have already considered in connection with mastication. By observing these conditions, we can produce artificial digestion in the laboratory, as perfect almost as that which takes place within the vital precincts of the stomach.

If we examine the contents of the stomach after the absorption of the peptone, we shall find it to consist of fatty substances, with their proteid frame work removed, starch cells which have escaped the action of the saliva, and the remnants of proteid substances, which the gastric juice had failed to reach. All saccharine substances and liquids, such as soup and wine, have also been removed by absorption into the blood, direct from the stomach. The mass retained in the stomach, and over which it has no further power of digestion or absorption, is

called *chyme*, which eventually passes into the intestines to be further acted on by the bile, pancreatic juice, and the various secretions from the intestinal glands. The principal action of the bile and pancreatic juice is directed to the emulsion and saponification of the fatty articles of food, in which condition alone they can enter the circulation, through the lacteals, or lymphatic vessels, which dip into the intestines and imbibe nourishment therefrom. The bile acts also as a purgative and a disinfectant. Hence, so called bilious subjects, who secrete insufficient bile, or who suffer from obstruction in the bile duct, are frequently subject to constipation and offensive evacuations. People with diseased pancreas are incapable of digesting fat.

When the chyme has been emulsified and saponified by the biliary and pancreatic secretions, and is ready for absorption by the lacteals, it is called *chyle*. This completes the process of digestion.

CHAPTER XXVIII.

INDIGESTION OR DYSPEPSIA.

THERE is no ailment in the whole catalogue of affections to which human beings are subject, of more general interest than indigestion. It may be safely termed a universal complaint, every individual of the human race, without exception, being more or less subject to departures from the strict standard of perfect healthy digestion. Beginning shortly after birth, and continuing through the stages of childhood, adolescence, and old age, the demon dyspepsia is more or less our companion through life. Some are more fortunate than others, their dyspeptic troubles being like transient gales, ruffling the surface of their placid lives, while others are tossed about and driven to grievous affliction by their trouble, which overshadows them like a cloud, extinguishing light and hope, bidding them brood in melancholy thought and unhealthy misgivings.

It is not only a universal complaint, but one of great importance, on account of the vital function of assimilation which it implicates, and

the almost endless chain of morbid incidents which springs from indigestion. Not only is the alimentary canal the great organic laboratory for the manufacture of blood from food-stuffs, for the healthy maintenance of the tissues in every part of the body, but the digestive centre is surrounded by numerous sensitive sympathetic nerves, which readily communicate the troubles of the stomach to every part of the system. Thus, headaches, cold feet and hands, palpitations, muscular spasms, are frequently found to be the remote but legitimate offspring of an unhealthy stomach. Even more complex symptoms, such as indecision of character, timidity, irritability, dimness of vision, strange noises in the ears, nightmare, disturbed dreams, faintings, evil forebodings, and all the eccentric phases of hypochondriacism, may be frequently traced step by step to depraved digestion.

Many people suffer from dyspepsia without knowing it; that is to say, they experience discomforts without being aware of their connection with the stomach. A man who suffers from irritability of temper, for instance, from timidity or indecision, if he ever thinks of attributing these symptoms to any impending or existing disorder, will be far more likely to connect them with brain affections than with indigestion. Again, a person suffering from flatulence in some of its peculiar forms, will imagine a score

of complaints, before he ever thinks of the stomach as the possible source of his trouble. Some females will convince themselves that they are suffering from inflammation of internal organs, heart disease, or internal cancer, under the sharp twinges of vagrant flatulent pains. They might possibly consent to severe neuralgia, as the interpretation of their sufferings, but the suggestion of such a light affliction as "wind" is an insult to the dignity of martyrdom, for which a certain class of patients have a morbid craving.

Indigestion, therefore, is a subject which may be assumed to be one of general interest. I have heard it said, that among a certain class of Hollanders, a healthy digestion is held in such esteem, that instead of using the customary formula, "How do you do?" these sagacious Dutch people regularly greet one another with the salutation, "How is your stomach?" Though inferior to our more catholick and artistic forms of greeting, there is a germ of wise philosophy and sympathetic ingenuousness in the plain spoken question, "How is your stomach?" and what better foundation can the complimentary speeches of civilised society have, than that which affects to such a large extent our physical and psychical welfare. How does the conventional topic of the weather pale before the momentous subject of digestion,

as an introduction to conversation! Wet or dry weather, except to the farmer, is a matter of secondary importance; but it is everything to a man whether the process of digestion is proceeding satisfactorily, and the world appears to him in rosy hues, or whether the juices of his stomach are perverted, filling him with bile and choler and spleen.

Confirmed dyspeptics have generally little thought for anything else but their own disorder, upon which they dwell with a diligence deserving of a worthier object. I knew a gentleman, who used to spend many hours daily at the fireside warming his socks. One pair he was always holding to the fire, ready to put on as soon as the pair on his feet began to feel cold. My appearance in the room did not usually discompose him, and I had time to watch the absurd gravity with which the operation was conducted. On my rising to leave, he would jump up in a state of great alarm, and take refuge behind the door through which I made my exit, for fear of the draught, hurriedly offering me the tips of his fingers, and anxious to bow me out. I met this patient subsequently in the street on a burning day in July, wearing a heavy great coat and muffled to the chin, walking with a dignified step, apparently lost in thought, and muttering something to himself. He explained that he was living by rule,

and was counting his steps, to regulate the exact amount of exercise he took.

One can imagine how pleased such a man would be to exchange the usual greetings for more pertinent inquiries as to the condition of the stomach. With what a depth of cordiality, deeper and sincerer than conventionality demands, could he shake hands, fervently muttering benedictions on the gastric organ.

Having reviewed the normal process of digestion, we are in a position to follow the various phases of departures from the healthy performance of this important function, and to understand and appreciate the symptoms, the causes, and the treatment of the various affections grouped together under the name of dyspepsia or indigestion.

With what object, it may be asked, do I reveal to the unprofessional mind, the profound physiological mysteries connected with this universal affection ? Do I propose to provide an effectual remedy for the evil, which daily convulses the human family, or to prescribe a path that shall avoid the traps and pitfalls, in which the frequented highways of civilized life abound ? If not, why do I seek to sharpen and give edge to dyspeptic troubles, by holding a mirror, in which the impaired stomach, liver, and kindred organs are seen crippling along, like jaded horses, lame and galled, exciting a compas-

sionate horror? Why do I ruffle the sleeping bliss, lulled to happy slumbers by ignorance and innocence? Why do I disturb those happy dreams, and fill the wakened mind with ghastly spectres; transparent anatomies, in which the organic body, like some exquisite model in a crystal case, is seen in all its fearful and wonderful details? Why, if I cannot weild the magician's wand, and bid dyspepsia depart, do I summon its ghost from the grim caverns of science, and terrify the dyspeptic with the apparition as well as the substance of his woes? The initial pain or inconvenience of indigestion may or may not be serious, but the consciousness that it proceeds from disordered organs located in ourselves, is almost invariably a crushing conviction. The obtuse labourer, who has neither leisure nor learning to think about his organs, and the child who is still sweetly innocent of such knowledge, can only experience the animal part of dyspeptic suffering, while the very essence and refinement of agony is that to which the accomplished dyspeptic attains, by the sheer force of his superior culture; by his capacity to brood over his nascent ills, till they grow and overpower him by their imaginary size and strength.

The prevalence of dyspepsia may however be mitigated, if it cannot be abolished, by the dissemination of a certain amount of knowledge relating to the affection. The value of a good

digestion is seldom appreciated until it is lost or impaired. Charles Lamb has observed, that a man never realizes that he is mortal, until he attains his thirtieth year. We may add, that he seldom realizes his possession of digestive organs before that age. Where, but in morbidly exceptional cases, do we see in youth that daintiness, that hypercarefulness in matters relating to diet, which is so often a characteristic of maturer years and failing digestion. The reply of a modern old man of thirty, when asked if he would take some cheese, is characteristic, "I am too old, sir, to trifle with my digestion."

What we want is, the rational and common sense part of the subject, and only so much of science, whether anatomy, physiology, or chemistry, as shall illuminate and render clear the teaching, and no more. The object of these papers has been, not to create amateur doctors, but to impart instruction in the important duty of preserving health, by enlisting the interest and common sense of the readers in the cause. To take a simple instance, large draughts of cold water at meals is injurious to digestion. This is a fact, which we may or may not know. If we know it, we realize the fact in a vague fashion, and often act contrary to our conviction. If, however, we be familiar with the physiology of the gastric juice, we shall see that undue dilution of the latter will impair its solvent

properties, and that a sudden reduction of temperature in the stomach is a violation of one of the cardinal conditions of gastric digestion. Our simple powers of reasoning convey to us a lesson, in the latter case, which, as rational beings, we are not likely to forget.

Bilious Attack.—There is a form of acute indigestion, popularly known as a *bilious attack*, which it would be well to dispose of first. I may observe, however, that the term has no reference to the origin of this complaint, the liver having nothing to do with the causation, though invariably participating in the derangement. It is one of those vague terms, such as "congestion," "heat in the blood," "a chill," "influenza cold," which are constantly used by people, and seem to afford them comfort, but convey no definite meaning to scientific minds, the same term being used by different persons, and by the same persons at different times, to express very various conditions.

These attacks are observed to occur more frequently in spring than any other time of the year. The depressing influence of the easterly winds which prevail at this season, may therefore have some effect in favouring their occurrence. The immediate cause is usually one of three things. The patient has eaten too much food, he has partaken of some dish that has disagreed, or the process of digestion has been

suddenly arrested by strong emotions, fatigue, or other causes. Over repletion, especially accompanied by alcoholic indulgence, is frequently followed by acute dyspepsia, particularly in elderly persons, with failing digestive powers. The articles of food which most frequently disagree are shell-fish and fatty and rich substances, such as fresh pork. Persons of feeble nervous power are easily affected by excessive grief, fits of ill temper, mental worry, and other allied causes. Fatigue operates in the same manner, by reducing the tone of the nervous system.

The three important symptoms are nausea and vomiting, pain in the abdomen, and diarrhœa. If the irritation be very great, there may be febrile symptoms; but usually the patient is cold and collapsed. A feeling of weight or uneasy fulness is first experienced in the region of the stomach, accompanied by nausea. The patient looks pale, and his hands and feet are cold and clammy, indicating some violent disturbance of the system. Sickness now comes on, bringing with it partial relief. When the stomach has been emptied, the act of retching frequently causes mechanical regurgitation of bile into the stomach, which immediately rejects the offending substance. The vomiting of bile under these circumstances has probably furnished the name "bilious attack" to this affection, the

effect being mistaken for the cause. Diarrhœa usually accompanies or follows the attack. The patient is left weak and exhausted for a day or two, and gradually recovers.

Viewing this affection with the light of physiological knowledge, how clear and intelligible it seems, how natural the nature and progress of the symptoms, and how plain and palpable the indications of treatment. We have here a substance in the stomach, acting to all practical purposes the part of a foreign body. Either the nature of the food defies the solvent action of the gastric juice, or the power of the organ to perform its normal duties is temporarily impaired or arrested by some cause, such as we have mentioned. Nature therefore exerts herself to expel the intruder by the means at her command, and vomiting and diarrhœa are brought into action to aid the purpose. As soon as this is accomplished, relief is experienced.

The conditions of the case being known and understood, the treatment is plain. The symptoms which most alarm the patient and his friends, viz., the sickness and diarrhœa, are to be viewed with favour, as conservative in their action, and not to be too hastily checked. If pain be present, however, and sickness continue in excess, these symptoms may be moderated by the application of linseed and

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mustard applications to the pit of the stomach. Considering the irritable condition of the stomach, nothing better can be prescribed for it than a period of rest, and with this view, food must be entirely forbidden for six or seven hours or more, and the patient ordered to remain in bed until all signs of irritation have ceased. The food must be carefully regulated for a day or two, and a tonic administered when necessary.

Three Classes of Dyspepsia.—The numerous derangements which are included in the term dyspepsia, or indigestion, may be divided into three great classes, viz., atonic, irritative, and nervous. By atonic are meant those forms of dyspepsia which are the result of atony or want of tone of the digestive organs and general system. Irritative dyspepsia includes all those derangements which are accompanied by inflammatory action, ranging from the slightest form of catarrh of the stomach to conditions bordering on acute inflammation; while nervous dyspepsia is an irregular morbid condition brought about by eccentric perversions of nerve function, and frequently exhibiting extraordinary symptoms, for which it is difficult to find an explanation.

It is of the greatest importance to be able to distinguish these varieties from one another, as they are produced by very different causes, are

characterised by distinctive features or symptoms, and require totally different modes of treatment for their relief. The first point, therefore, to be ascertained in every case of dyspepsia we propose to treat, is, to which of the three varieties it belongs. This is not always an easy task, as, although the features of each type are sufficiently marked for purposes of distinction, there are cases, presenting mixed symptoms, where, for instance, irritation is added to the atonic type, or the nervous element is imported into the irritative form, which render the discrimination of these affections a task of unusual delicacy. And yet the success of treatment depends entirely on a sound and correct judgment as to the exact morbid condition of the offending parts. There is scarcely a class of affections, in which an error is more likely to be committed, and none, perhaps, in which chance prescriptions are less likely to succeed, than that which we are now considering. Nothing but a thorough knowledge of the digestive organs and their functions in health and disease, will help the practitioner when he finds himself in the mazes and perplexities of dyspeptic trouble. Nothing but a patient review of his knowledge, and a thorough sifting of symptomatic evidence, will enable him to see his way clear before him. Honest enquiry and sound argument will be rewarded with success, while

indolent investigation and hap-hazard prescriptions are tolerably sure of aiming wide of the mark, in a class of affections teeming with difficulties and embarrassments.

General Causes of Dyspepsia.—Before entering on the different kinds of indigestion, it may be useful to give a glance at the various causes which bring about the conditions of departure from the normal process. In this connection, it must be remembered that the stomach, though perhaps the most important, is not the only organ connected with the digestive function. The teeth, the tongue, the salivary glands, the liver, the pancreas, and a long tract of intestines studded throughout with active glands, are digestive organs, as well as the stomach; and, in seeking for the causes of indigestion, we must examine each one of these organs, and the food we eat, as well as the stomach, for the offending member, whose failure to perform its own allotted function, deranges the whole system of which it is a unit.

Causes referable to Food.—We have already stated that food must contain certain elementary substances in fixed proportions. If this condition be notoriously violated, and, let us suppose, the saccharine element to be unduly predominant, dyspepsia will be the result. The blood will appropriate what amount it requires; the remainder will lie decomposing in the

stomach, giving rise to acid and gaseous products, and disturbing the economy. Food may also be rendered unsuitable by defective cooking, or from having undergone putrefaction. Errors in regard to the amount of food and the frequency of meals are also fertile sources of dyspepsia. Indulgence in food in excess of the requirements of the system is one of the commonest causes. The perfection to which the art of cooking has attained, and the artificial stimulation of the appetite by spicy condiments and alcoholic beverages, as well as the abuse of tonic medicines, are the great means by which we are betrayed into excessive eating, irrespective of the wants of the system.

The intervals between meals should not be less than five hours. The usual hours for meals, viz., 8 A.M., 1 P.M., and 7 P.M., are therefore correct in principle. It is the interposition however of uncanonical collations between the regular meals, that have to answer for much of the dyspeptic trouble springing from this cause. The surreptitious biscuits and glasses of wine, which are intended to support imaginary sinkings and faintings, the goodly cups of beef tea, which bridge the empty spaces from breakfast to luncheon, and the afternoon tea, which beguiles the weariness and lassitude from luncheon to dinner; these are not the stay and support they are intended to be, but mischievous

practices which interrupt the harmony of digestion, extending their pernicious influence to both the meals between which they obtrude themselves. Insufficient or defective food is also a source of indigestion, especially among the poorer classes.

Causes referable to the Stomach.—With regard to the causes referable to the state of the stomach, deficiency or excess of the gastric juice may be mentioned as taking the first place. We have already referred to the causes which interfere with the quality, as well as quantity, of this important secretion. As a general rule, inflammatory and febrile conditions and general debility tend to produce deficiency, while affections such as cancer and ulceration, which keep up a constant irritation in the stomach, have the effect of increasing the flow and perverting the gastric juice. Disease of the secretory glands, such as are brought on by constant tippling, tend also to check the secretion of gastric juice, by causing degeneration and atrophy of the structures in which it is secreted. Nervous influences, when operating through the moral or intellectual system, or when produced by physical depression or exhaustion, cause deficiency, while those derived by sympathy from other organs have the contrary effect of exciting and stimulating the secretion.

Constitutional Causes, and Tight Lacing.—We have also referred to the deficient movements of the stomach, caused by general muscular weakness, as a possible cause of dyspepsia. This may also be brought about by wearing tight corsets and by the injurious pressure on the stomach exercised in certain trades. On the other hand, in certain excitable states of the nervous system, the contractions of the organ are in excess, causing the food to pass out long before it is digested.

General Features of Atonic Dyspepsia.—Of the three varieties of dyspepsia, the atonic is that which is most frequently met with. Its chief characteristics are, that it tends to run a chronic course, that it is unattended by fever or actual pain in the abdomen, but a feeling of uneasy fulness and distension after meals, accompanied by languor, depression of spirits, and general relaxation of the system.

The tongue in atonic dyspepsia is broad, pale, and flabby. Flatulence is almost always complained of, and the fermentation going on in the stomach gives rise to sour, rancid, or offensive eructations. The appetite is usually impaired; but thirst, which is a prominent symptom of the irritative forms, is absent in atonic dyspepsia. Constipation is a prominent symptom. Pain in the left side and between the shoulders is frequently experienced, greatly

alarming the patient, and exciting in his mind fears of "pleurisy," "congestion," and other equally intelligible affections. Palpitations are also frequent, producing alarmingly tumultuous action of the heart, and no little apprehension of heart disease from the patient's point of view. The circulation is weak, the complexion pallid, sallow, and muddy. The intellectual faculties are often impaired, especially the memory and attention. The temper is apathetic and timid, and the patient is harassed by indecision and weakness of purpose.

The chief indications of treatment are to regulate the food, to correct defective conditions of the stomach, the system, or the blood, by appropriate remedies, and to secure healthy nervous influence by avoiding sources of depression and exhaustion, and cultivating such habits and modes of living as shall give health and energy to the nervous system.

Diet in Atonic Dyspepsia.—The regulation of the food is perhaps the most important part in the treatment of atonic dyspepsia. It is often a misfortune that it is so, on account of the frequent temptations thrown in the patient's path to violate the restrictions and prohibitions imposed upon him. Unexpected opportunities of tasting forbidden dishes suddenly thrust on an irresolute dyspectic, and appealing, by their tempting appearance and savoury odour, to his

peccant senses, make resistance more than mortal. Would that the remedy, comprising the dietetic, medicinal, physical, and psychical, could be ground down and condensed into silvered pills, or inspissated into a portable elixir. Then might we hope for what is often expected of doctors, but which no mortal physician can confer, viz., unconditional cure; the conveyance of speedy relief by means of draughts and pills, without imposing part of the treatment on the patient himself, subjecting him to rigorous discipline and cruel entrenchments. Then might we hope to take the most refractory and insubordinate dyspeptic in hand, and make him well in spite of himself.

There is however no such royal or epitomized method of treating indigestion, and the patient must be made to understand at the outset, that his conscientious co-operation and entire submission are a *sine qua non* in the treatment, an indispensable proviso in the compact between him and his physician.

We may draw up elaborate tables of diet, and set forth the digestibilities of food with pompous precision; but that does not appear to be the chief knot in the tangled web of digestive disorder. It is not so much the unsuitability of foods, as their excess, that burdens the stomach and taxes the solvent properties of the gastric juice. What a pity it

is, that there could not be a permanent and direct connection between the needs of the system, or the capacities of the gastric juice, and that sensual instinct hunger, like that between wheels in gear, whose revolutions bear a constant and definite relation to each other. Wrested from its true and natural place in the economy, the appetite is made to subserve the baser instincts of our nature, and recognises nothing but the pampering and bribes on which it lives; least of all its legitimate master and natural controller, the organic body, which daily suffers by its prostitution.

Immoderate eating produces more dyspepsia than all the other causes put together. But whoever receives this statement with any other feeling than a vague curiosity, as a statistical detail of doubtful interest, in which personally no individual is concerned? Temperance in eating is an art, requiring habitual self-control and practice. The soldier, the sailor, and all those who live under a rigorous discipline, have happily no opportunity of violating the paramount laws of moderation. The boarding school boy also, whose coarse and meagre fare is so often the subject of animadversion and complaint, is thrice happy in the immunity he enjoys from temptations to surfeit; and chill penury is more than recompensed by the healthy buoyance of mind and body which

compulsory abnegation produces. With every facility, however, for indulgence, and all the fascinations of art put forth to tempt the sense of appetite, the invariable tendency is to exceed the physiological wants of the system, and the great desideratum is the virtue of self-denial. The patient who is the subject of atonic dyspepsia must therefore be impressed with the importance of strict moderation in the treatment of his complaint, and with the fact that nothing conduces to quicken atonic forms of dyspepsia into acute inflammatory conditions of the stomach more effectually, than excessive eating and drinking. While enforcing this point, I may add that the wants of the system are to be estimated chiefly by the varying amount of expenditure, and by the definite size of the body to be nourished. A stalwart man, employed in some laborious occupation requiring constant severe exercise of the muscles, would consume two or three times as much food as another of smaller frame and sedentary habits, with greater claim perhaps to be considered a moderate eater than the latter. Why is it that the appetite becomes sharp when we take exercise in the cold air, and fails us when we spend our time in sedentary occupations in close, ill-ventilated rooms? Because, on the one hand, both the exercise and the cold create expenditure, and food is demanded to supply

fresh tissue and animal heat; and, on the other hand, there is little waste, and therefore little food required, and consequently diminished appetite. Thus far, we recognise a beautiful adaptation of Nature, by which the wants of the body are adjusted by a system of self-regulation. Man, however, is wiser than Nature, and generally has his appetite strung up to a state of artificial tension, with the aid of tonics, alcohol, and various other stimulants, as though its sole function were to minister to sensual pleasure, and not to serve as an index or guide to the necessities of the blood, and the tissues which it feeds.

With regard to the kind of food suited to dyspeptics, those articles which are difficult of digestion, and therefore to be avoided, may be mentioned first. Such are broths, fatty soups, young or pasty potatoes, peas, beans, parsnips, and cabbage. They usually produce flatulence, and aggravate the sensations of oppression and distension, which are experienced after meals. Malt liquors are also found to produce flatulence, and their place must be taken by light wines. Ardent spirits, well diluted, may be permitted occasionally, to restore tone to a weak stomach, and to stimulate the secretion of gastric juice, but as a daily beverage at meals it can scarcely be too severely condemned. The safest beverage of all, however, is that which is brewed in the

bubbling spring, innocent of all but its cool, clear, and sparkling properties. Happy is the organism which knows no other, in whom the act of stimulation never begun, becomes ever after a vital necessity, which has never known the wild delights and raptures of pulses bounding with an artificial stimulus, whose joy, to borrow a phrase from Schiller, is healthy "Nature's calm rotation."

Fresh beef and mutton in moderate quantities generally agree, as also chicken and game, with the exception of hares and rabbits. Fish is not generally desirable, though whiting and soles may be sometimes permitted. Tripe, sweet-bread, and trotters may always be indulged in. Unless the potatoes be exceptionally good, it is much safer to substitute rice, and for vegetables, spinach or vegetable marrow may be eaten. Oysters are generally very digestible and nutritious, unless the patient is prejudiced against them. The same may be said of eggs. Tea and coffee it is almost always necessary to cut off, and milk and water, or cocoa made from the nibs, may be ordered instead. Milk being, so to speak, a solid food in liquid form, should never be taken after a solid meal. Tea is also injurious, when taken with meals in which meat is eaten liberally, as it perverts the action of the gastric juice and delays stomach digestion. Ginger beer, lemonade, and other sweet ærated

drinks with meals are not calculated to promote digestion, and should be discarded as worse than puerilities, and the inocuous indulgences of tee-totallers. It is only necessary to mention such articles as pastry, cheese, or salted meats and provisions, as their unsuitability to weak stomachs is recognised by all. Sugar in any form must be avoided in atonic dyspepsia, on account of its tendency to derange the liver. Farinaceous articles of food are admissible, as their digestion is conducted in the intestines, and the stomach has nothing to do with their elaboration.

Medicinal Treatment of Atonic Dyspepsia.—The next part of the treatment consists in the administration of appropriate medicines, and refers to what in technical language are termed the *therapeutic* measures.

There are many individuals, *in* the profession, as well as out of it, who have no great faith in the potency of drugs in disease, who recognize in the pharmacopœia, nothing but a huge system of sham, and in pills and mixtures, nothing but the playthings of a feeble delusion, or at best an innocent institution for the benefit of doctors and chemists; who suffer their physician to feel their pulse and see their tongue, less with the hope of benefiting by his ministrations, than with a quiet, polite infidelity, a cynical resignation to an existing custom, without the shadow of belief in it. I do not belong to this

class. When I cast my eye along the rows of familiar bottles in my dispensary, resembling, by their burnished labels and trim stoppers, an army of troops in battle array, I feel like the centurion of old, that I have my battalions, companies, and columns in perfect command. I say to this one, go, and he goeth, and to another, come, and he cometh, and to my servant, do this, and he doeth it.

Who that ever watches the effect of opium for instance on pain, can afford to sneer at medicine. By means of a comparatively recent contrivance, the hypodermic syringe, physicians are now able to produce the full effects of morphia—the active principle of opium—almost instantaneously. A few drops of a solution of this substance are injected underneath the skin, and in less than five minutes, the patient passes from writhing torments to delicious empyrean calmness. In less than five minutes the wail of anguish is hushed, and the tortured brain is placidly reposing in the realms of dreamland.

Another typical instance is afforded in the staying power of the drug, *bromide of potassium*, on the convulsions of epilepsy. By means of large doses of this drug alone, the most violent forms of epilepsy may be combated, and the recurrence of periodical fits infallibly averted.

With such efficient servants, a man must have his own feeble and bungling administra-

tion to blame, if he cannot command a reliable and capable service. Instead of lamenting the feebleness of drugs as a weapon for fighting death and disease, I am lost in awe at the infinity of its power, almost every mineral, flower, grass, and root contributing its properties to the armamentary of physic, and giving birth to new agencies and fresh forces, by combining with one another in endless variety. As well may a man sit impotent before an organ, and declare there is no music in the instrument, as an ignoramus in medicine say, that it is a feeble power, because he is not strong enough to wield it.

At the same time, I should keep the drugging part of the treatment strictly in its place in relation to the *vis medicatrix naturæ*, to divert and regulate the latter with tact and dexterity, as an expert horseman handles the curb-rein of his gallant and mettlesome steed.

Atonic dyspepsia being the local manifestation of a general enfeeblement of the system, the medication should consist principally of the tonic type, and directed to the improvement of the whole system rather than the stomach alone. With this object, iron is found to be a useful agent. Great care, however, is necessary in its administration when the stomach is irritable. If the tongue be coated, it may be accepted as a sign that iron will not be tolerated,

and the stomach must be prepared for its reception by other remedies.

Some dyspeptics are constantly dosing themselves with what they call *tonics*, by which they mean bitter medicines, to improve the appetite. These medicines, so far from acting as tonics, very frequently produce irritation of the stomach, and in improving the appetite, furnish ample material for aggravating indigestion. Strychnine, however, forms a valuable exception to the rule, and is a most useful bitter tonic in atonic dyspepsia. It gives nervous energy to the stomach, prevents flatulency and acidity, and therefore improves the digestion as well as the appetite. Nux vomica, the bean from which strychnine is made, is even better suited in these cases than the more powerful alkaloid. Quinine is a doubtful remedy, on account of its tendency to produce irritation in the stomach, and must be given only when the tongue is clean. It is, however, a drug of great power when administered judiciously in suitable cases.

A Dinner Pill.—Many dyspeptics are in the habit of taking a *dinner pill* at meals, which is often of great service in aiding digestion. The following is the prescription for a useful pill of this kind, and will be found to prevent distension and oppression after meals :—

Rhubarb powder . . .	4 grains.
Ipecacuanha powder, . .	1 grain.

Hydrochloric acid and pepsine are valuable remedies when the secretion of the gastric juice is found to be deficient. The best aperients in atonic dyspepsia are rhubarb and aloes. The habit of constantly resorting to purgatives is, however, to be condemned, as tending to exhaust the muscular and nervous power of the intestines. If there be much acidity with constipation, magnesia forms a useful aperient, while the presence of flatulence calls for the use of aromatics and antispasmodics, such as cardamoms, cloves, ginger, peppermint, ether, salvolatile, and assafœtida.

Hygienic Treatment. — The last indication of treatment is to remove the patient from the influence of unfavourable conditions and surroundings, and place him in a new sphere of health. What does this mean in most cases? It means that the patient must give up his employment, that by some occult art, he must rid himself at once of his troubles, that he must exchange the hovel in which he resides for a spacious mansion, that instead of spending the greater part of his time in an ill-ventilated office in town, he must betake himself to fields and meadows doing nothing, that the members of his household must be transformed from erring mortals to immaculate paragons. As well bid the patient fly. The conditions which operate unfavourably on the poor man's health, are as

immutable as the planet's orbit or the Ethiopian's skin, and if there is a remedy for him, it must be found within the boundaries of his trammelled circumstances. Forbear to mock a poor man's affliction, by prescribing champagne and turtle soup, or tempt a stricken bankrupt with glimpses of the health-giving ocean and sunny climes. But speak to him of temperance in eating and drinking, of early hours, of the cultivation of elevating habits, of the folly of violating the cardinal laws of health, of avoiding reckless and wilful exposure to damp and cold, of cleanliness, of purity, of hygiene, of rational living; not the things which wealth alone can purchase, but the commons and moorlands of health, which rich and poor can command alike, the meadows and pasturages, in which Lazarus can glean as rich a harvest as Dives.

A Weak or Irritable Nervous System as a source of Dyspepsia.—The great source of our physical troubles, is the excitable or irritable condition of the nervous system. If we allow ourselves to be worried over every trifling annoyance, or if we are not constantly masters of our passions and emotions, the irritation or excitement is sure to be transmitted from the nerve centres to the organs. Hence dyspepsia is common in petulant and irritable persons. It seldom occurs to a person to cultivate the habit

of mastering such weaknesses, in the same manner that he would practise some art with the object of becoming an adept or proficient in it. Why should not a person acquire proficiency in the art of taking things easy, and preserving an even mind under adverse circumstances, in the same way as the piano or violin is practised and mastered. Many years of patient industry are devoted to the latter arts, and no amount of toil and perseverance is considered too much to acquire the grace and facility of a master's touch in painting; but the school in which this wholesome species of self-discipline is taught, is too often the cruel world, and its teachers stern adversity and affliction. And yet, what is the melody of a piano or violin compared with the music of a sweet cheerful voice, a rainbow of sweet sounds, a voice attuned to the harmony of joy, good temper, and good feeling. What picture can compare with that of a face, in which is reflected the holy calm of a life rippling with subdued joys,

> "With a diviner and serener joy
> Than all thy heaven of money-bags can bring
> Thy dry heart, Worldling."

Before passing on to the consideration of the irritative forms of dyspepsia, let me once more indicate the chief characteristics of the atonic

type, which we have been discussing, and endeavour, by comparison of the two varieties, to show the main difference between them.

Atonic dyspepsia is the local manifestation of a general constitutional condition. There is no actual pain, but a feeling of abdominal distension and oppression, accompanied by mental and physical languor. The tongue is pale, broad, and flabby, and the symptom of thirst is absent. There is no fever, nausea, nor morbid alteration of the urine.

Irritative Dyspepsia.—In irritative dyspepsia, on the other hand, pain or tenderness is invariably present, and the tongue either presents a bright raw appearance, with pointed tip, or it is furred more or less in the middle, with the papillæ showing brightly through the fur. The urine is altered, being dark and turbid, nausea is frequently present, and thirst is usually a prominent symptom.

The breath in irritative dyspepsia is very often heavy and offensive, the gums are relaxed and bleed easily, and there is a tendency to increased flow of saliva, especially at night, when it escapes from the mouth during sleep, wetting the pillow. The throat is very often relaxed, and causes some annoyance by the frequent coughing and hawking which it induces. Constipation is a troublesome symptom, and is frequently aggravated by involuntary straining

at stool. The evacuations are occasionally streaked with mucus and blood, while in other cases, nothing but flattened bands of mucus are passed, which naturally alarm the patient.

Patients who suffer from this affection for any length of time acquire a peculiar earthy complexion, and gradually lose flesh, causing their friends to speculate whether they are the subjects of consumption. A ruby tint on the upper part of the cheek and the nose is also said to be a symptom of this disorder, and patients are very subject to suffer from cold hands and feet, alternating with burning palms and soles. There is also a great tendency to catch cold, and the voice is frequently hoarse and husky. Frequent sighing is also observed to be a symptom.

The urine is dark and turbid, being charged with earthy phosphates, urates and oxalates, and occasionally it is cloudy on emission.

The nervous system sympathizes with the disturbance, and intellectual depression and irritability of temper are frequently observed. The patient loses his reasoning powers, his memory fails him, and he gives way to fear, timidity, and anxiety. He is always in a desponding mood, and imagines that all kinds of trouble and misfortune are impending. Dr Golding Bird relates the case of a merchant surrounded by affluence, whose life was em-

bittered by apprehensions of impending beggary, and visions of the interior of a workhouse. Cowper, who seems to have been afflicted with dyspepsia, describes the depression he felt in the morning, thus :—" I awoke like a toad out of Acheron, covered with the ooze and slime of melancholy." An eminent German physician writes :—" Only a few years since, I treated a very wealthy man for chronic, gastric, and intestinal catarrh, who, during the disease, thought he was near bankruptcy, and left unfinished a building that he had begun, because he thought he had not sufficient money to continue it. After spending four weeks at Carlsbad, his old strength and feelings returned, he finished his house with great splendour and has been well ever since."

Palpitation and irregular action of the heart are frequently present, and produce in the patient's mind painful apprehensions of organic disease, which occasionally not even medical reassurance can remove.

On the other hand, we often meet with cases, where this form of dyspepsia is the immediate result of congestions, produced by disease in other organs, such as the heart, lungs, liver, and kidneys, and they form by far the most intractable class for treatment, the primary cause being generally of an incurable nature. Such patients may be found flitting from one doctor

to another without obtaining relief, and finally abandoning themselves to despair, with a cynical mistrust of the faculty in general. It often takes much time and patient investigation to follow the tortuosities of a disease to its true source, and the medical attendant is entitled to a generous confidence from his patient. It is far from derogatory to a doctor's reputation that he fails to recognise the true nature of some obscure case at the first examination. I always regard with the greatest pleasure and triumph those cases which baffled me at first, and finally surrendered after a hard fight of steady, persevering investigation, and I cannot help admiring the spirit of the patient, who, speaking to me of a brother practitioner's attempts to extract a tooth for him, finely remarked, "He failed six times, but he had noble courage, sir, and tried again and succeeded." The transference of the courage from the victim to the operator in this case was a remarkable example of unselfish generosity.

Treatment.—The treatment of irritative dyspepsia consists in the use of sedatives, such as opium, bismuth, and prussic acid, and of pepsine in some cases. Where an aperient is required, aloes may be advantageously used, except when the patient suffers from piles, in which case the Friedrichshaller waters are a safe laxative. The mineral waters of Harrowgate,

Bath, and Leamington are also said to be beneficial.

Diet and Clothing.—The use of animal food is contraindicated, except in very moderate quantities. Great care is to be taken with regard to the clothing, flannel being always worn next to the skin, on account of the peculiar liability to catch cold in this complaint.

Stimulants to be avoided in Irritative Dyspepsia.—With regard to stimulants, it is safer to avoid them altogether, as they generally tend to increase the irritation, and excite inflammation in the gastric mucous membrane.

Nervous Dyspepsia.—The last form of dyspepsia is that which is brought about by some perversion of nervous function, and presents the most contradictory and inexplicable phenomena for its symptoms. In one case the patient possesses a ravenous appetite, nothing appearing to appease his hunger; while in another he finds no pleasure whatever in eating, and merely takes food as a duty, in order to preserve his life. In a few cases the appetite is perverted, and such articles as coal, chalk, or clay are devoured with apparent avidity. Pain is frequently complained of in the stomach, but generally after the blandest food, such as arrow-root and corn-flour, while indigestible substances are tolerated with ease. In other cases the pain is relieved by taking food. The pain

would all at once disappear, and suddenly make its appearance again at some unexpected time.

Vomiting is also another symptom, continuing at one time with such regularity as to excite suspicions of ulceration or cancer of the stomach, disappearing suddenly again at another, to lull the patient's fears and bid him hope awhile. Another form is characterized by excessive appetite, accompanied by exhausting and intractable diarrhœa, while some again are associated with various forms of hysteria, in which the unfortunate subject is too often the victim of unjust and cruel suspicions of endeavouring to excite sympathy by deceit.

The origin of these varieties is to some extent involved in obscurity. This much is certain, however, that nervous exhaustion, in whatever way induced, plays an important part in producing these anomalous types of indigestion. They cccur most frequently in the female sex; and amongst those causes which favour the disease, may be mentioned the depressing emotions, severe intellectual effort, excessive bleeding, intemperance, the hysterical or hypochondriacal constitution, malaria, gout, and idiosyncrasy.

The treatment of these cases refers to medicines for palliating the symptoms, and general measures for improving the nervous system.

CHAPTER XXIX.

A MODEL MEDICINE CHEST.

MANY years ago, when I was under orders to start, within a few hours' notice for one of the most remote districts of Scotland, as temporary medical officer, my greatest difficulty lay in the selection of the drugs that were to form part of my kit. The journey of forty-six miles I was about to undertake in a light dog-cart, whose capacity for carrying heavy baggage had been somewhat impaired by age. This fact, as well as the hilly nature of the country we were about to drive through, rendered it imperative that my traps should be of the lightest description, and forbade my taking anything with me but absolute necessities. The problem before me was, to pack away in a space of some two feet by one, the balm for every physical ill that flesh is heir to; to condense the pharmacopœia into the dimensions of a writing desk; to choose a few handy weapons, out of the multitude of tools, for fighting the whole catalogue of diseases, from catarrh to catalepsy, from hysteria, hypochondria, and hydrocephalus, to pneumonia, endo-

carditis, gastrodynia, enteritis, hepatitis, nephritis, and ichthyosis. Can anyone imagine such hard-named diseases being cured by such meek and homely medicines as sweet spirit of nitre, sal prunelle, blue pill, castor oil, chlorodyne, dill water, and liquorice powder?

The materials for my personal comfort and convenience were easily stowed away, but it was quite another matter to choose my companions and allies from the rows and rows of faithful, efficient drugs. There was good laudanum, a sable but staunch supporter, and by his side the limpid prussic acid and golden nux vomica, two genuine powers in dyspepsia, while, on the other side, guarded by stopper and cap, were the volatile champions, chloroform and ether, and next to them our *fidus Achates*, morphia. There was ponderous mercury, stinging aconite, chastening belladonna, pacific henbane; also the stolid ministers, iron and lead. There were also valerian and assafœtida, more useful than odoriferous, and the invaluable bromide family, and dusky iodine and her inseparable progeny the iodides, not to mention rhubarb and magnesia, Epsom salts, senna, aloes, jalap, podophyllin, and sulphur, the light skirmishers which flank the column, with the salts of soda and potash bringing up the rear. In a remote corner were the cynical and caustic group of acetics, mineral and vegetable acids, and the astringents, from

the most corrosive tempers to the mildest and gentlest disposed tonics. I lingered yet awhile over the blandishments of medicine, the colouring agents, cochineal, rose and saffron, and the flavouring materials, syrup and orange, cloves, cinnamon, and ginger, by which children are bribed, and older ones wooed, to swallow the nauseous draught.

They are all members of the same fraternity, individuals of a guild or corporation, each occupying a definite place and performing a specific duty. Not one of them can be conveniently spared, and the task of reducing the pharmacopœial cabinet, so as to make the smallest number do the greatest amount of work, is less easily accomplished than one would imagine, and requires no little knowledge and experience. He was an easy-minded practitioner, whose whole stock of medicines consisted of two mixtures, principally composed of water, which he kept in two large jars behind a screen in his consulting room, serving from each alternately to every patient that applied to him, without reference to the nature of the complaint to be treated.

I am told that in naval vessels, which do not carry a doctor, they are provided with mixtures, each bearing a numbered label, and a book of directions containing a description of each disease and its appropriate remedy, referring to

the numbers on the medicine bottles. One of the crew having fallen ill during a voyage, the book of directions was consulted, and remedy No. 7 was indicated. This bottle was, however, found empty, and the patient would have died, but for the ingenuity of the commander, who ordered a mixture of 4 and 3 to be substituted. This was duly administered, and brought about a speedy cure, showing the value of arithmetic in pharmacy.

The following incident was also related to me by a naval officer, and may be classed among those narratives which sceptics term "yarns":—

"Finding that the medicine chest," he observed, "occupied too much space in the saloon, and that we were constantly knocking our knees against it under the table, where it lay, we emptied all the bottles of medicine, tinctures, powders, syrups, and solutions into a tub, and broke up the chest. Having mixed the heterogeneous contents of the tub well together, we served it to the crew in small phials, directing them to apply to them in case of illness, feeling sure that one or other of the ingredients would hit off the complaint, whatever it chanced to be. The men, however, looked suspiciously on the repulsive compound, and carefully abstained from even the appearance of illness during the voyage." Whether

this was meant as a piece of fine sarcasm on the profession to which I belong, I cannot say.

It is a task of even greater difficulty to arrange a compact portable pharmacopœia for the use of lay persons, who do not fully understand the nature and action of drugs. It is like selecting tools for amateurs, and we must be wary about trusting double-edged instruments into awkward and unpractised hands.

The model medicine chest, which I propose to describe in this paper, may be more appropriately termed, "The Medical Valise," my remarks being confined to the fitting up of a small portable case, with medical and surgical appliances, such as a person would find useful during a summer trip to remote districts, either at home or abroad,

Self-medication is a favourite British instinct, which at home is either suppressed by the family physician, through the emphatic force of that dignitary's prohibition, or fades away into nothing, and is gradually damned by his faint praises. But under the genial and uncontrolled influences of travel, the dormant humour is awakened, and in the depths of portmanteaus and trunks are hidden away cordials, elixirs, and specifics, potent beyond description against the chance afflictions of travelling Britishers.

Next to dosing himself with his favourite nostrums, the nomadic leech loves to practise

on a brother in affliction, and in no sect is the *cacoethes medicandi* so strongly implanted, as that which looks after the cure of souls, and some of the greatest quacks I have ever come across have been country clergymen who pretended to a knowledge of medicine. During my wanderings in the far north, I chanced to arrive one night at a lonely wayside inn, where shelter was denied me on account of some festivity going on at the time, and which was monopolising the slender accommodation of the house. I was, however, provided with a bed in the house of the local clergyman, who, I heard, had some reputation as a medical practitioner, and carried on a lucrative practice in the neighbourhood, being paid for his services in peats, oatmeal, sheep, milk, eggs, and butter, in lieu of guineas. In the course of the evening several patients consulted Sir Oracle in my presence, to each of whom he administered a pill made of aloes and toilet soap rolled in sulphur. On my inquiring the nature of the last ingredient, the spiritual apothecary paused in his operations, explaining that he *believed* it was sulphur. "It does not matter," remarked the reverend practitioner, "I often use peat ashes, and it answers the purpose equally well."

Diarrhœa being the most likely complaint during a summer trip, it is the first we should provide for in a travelling medical store. The

great causes of diarrhœa are indigestible food, heat, excessive exertion, and depressing emotions. The following mixture will be found a most efficient remedy, and the most violent and intractable case will be checked with one or two doses:—Take of aromatic chalk and opium, 3 drachms; of tincture of catechu, ½ ounce; of syrup of oranges, 1 oz.; of distilled water to make up 8 ounces. Take two tablespoonfuls after each relaxed motion. The bottle to be well shaken. Label, Diarrhœa Mixture.

The opposite condition of constipation may be met by compound rhubarb pills, and blue pills, a few dozen of each being carried in the valise. If the patient be of a bilious temperament, subject to headaches and piles, the use of a blue pill along with a compound rhubarb is to be recommended, while for a simple aperient, one or two of the latter alone are to be taken.

A dozen or two of assafœtida pills may also be carried; they are very useful in cases of troublesome flatulence. One pill may be taken three times a day, and there is probably no drug in the whole pharmacopœia that exercises such a power in controlling flatulence.

Colic is another troublesome complaint, very apt to arise out of errors in diet, and so great is the suffering, that the remedy must be close at hand if the patient is to be spared prolonged agony. Chlorodyne is perhaps the best internal

remedy for this affection, being composed of all the most powerful antispasmodics in combination. Thirty to forty drops may be given in water, to be repeated if necessary. The patent chlorodyne of Dr Collis Browne is more to be relied on than pharmacopœial preparations. Linseed poultices must be applied to the abdomen in addition, and changed every half hour until relief is obtained.

A small quantity of salvolatile should also be taken, as it is a useful remedy in nervous headaches and faintness, and procures all the action of a diffusible stimulant. One teaspoonful in a wineglass of water is the dose.

Dover's powder is a useful remedy in the first stage of cold. A few powders of 10 grains each may be carried in a stoppered bottle to preserve them from the action of the air. When a cold is threatening, or when it is in its initial stage, it may frequently be prevented or cut short by a Dover's powder administered at bedtime in a basin of gruel, assisted by a warm bath.

A bottle of the liniment of opium will also be found useful in muscular and rheumatic pains, and also a bottle of carbolic oil, one in twenty, for cuts and bruises, with a supply of lint and bandages and adhesive plaster.

The following will be found an effective sleeping draught in case of insomnia :—Take

of bromide of ammonium, 80 grains ; of solution of bimeconate of morphia, 40 drops ; of hydrate of chloral, 80 grains ; of water to make up, 4 ounces. Take two tablespoonfuls at bed-time for a dose.

When there is deficiency of appetite and languor, the following may be taken as a *pick-me-up* :—Take of liquid extract of cinchona, 1 ounce ; spirits of chloroform, 80 minims ; tincture of nux vomica, 160 minims ; aromatic spirits of ammonia, 160 minims ; rectified spirits up to 2 ounces. One teaspoonful in a wine-glass of water 3 times a day before meals.

For neuralgia, the following pills of quinine and morphia may be carried :—

Take of sulphate of quinine, 48 grains ; of morphia, 12 grains. Make into 48 pills and take one 3 times a day.

CHAPTER XXX.

OUTDOOR GAMES AND PASTIMES.

THERE is no nation which makes such a serious business of sport as the British. Fishing, shooting, racing, boating, cricketing, and lawn tennis are not mere idle pastimes. They are elevated almost to the dignity of sciences, to the cultivation of which a great deal of valuable time and energy are unstintingly devoted. The annual contests which regularly stir up the sporting instincts of the Briton, are not matters of passing interest, but events of national and vital importance, anticipated and discussed with the greatest gravity, and celebrated with earnest enthusiasm.

The first recommendation of outdoor games and pastimes is, that they entice us into the fresh air, away from the polluted pestilential atmosphere of the study, the counting house, or workshop. How can the heart work healthily, or the brain perform its functions wholesomely, in a medium charged with carbonic acid gas? Granting that healthy activity of the organs depends upon vigorous circulation, and that the

circulation derives its energy from the respiration of air duly charged with oxygen, it follows that an hour or two spent in the open air is an indispensable condition of health. Impure air has a depressing effect on the nerves and nerve centres. It causes stagnation in the circulatory currents, impedes nutrition, and engenders morbid processes of every description within the body. These facts apply with double force to the case of children and older boys and girls, in whom the process of development makes heavy demands on the circulation, while rapid nutrition and increased waste of tissue demand a more liberal supply of oxygen. Let any one who has worked closely for many hours in a small room, where perhaps several individuals have shared with him the slender air supply of the apartment, creep out into an open field or hill top, and he will at once be sensible of the agreeable change from a vitiated to a pure atmosphere, and understand the depressant effects of the former on the nervous system. The lethargy and dulness, which surmount and weigh us down, under the noxious influence of carbonic acid, are immediately removed on emerging into the open air, and the captive spirits are liberated into their wonted exhilaration and elasticity.

What does many a man care for sport, who periodically goes into the country, ostensibly

with the object of fishing? It is the ozone of the mountains and valleys and glades that he sighs for, the keen bracing breezes, spiced with the perfume of rural Nature, rustling among the cornfields or whispering in the woods; these are what he really seeks, while feigning to flog the stream for salmon and trout. I knew a professional gentleman who regularly visited North Scotland in the summer with the avowed purpose of angling in the foamy burns that swept the moorland hills of that wild country, but who was generally found stretched supine on the bank, with his hat over his face, while his gillie plied the rod. Who that has watched, as I have done, eight consecutive barrels discharged by a shooting party at a solitary grouse, without touching a feather, would say that the motive which impels the so-called sportsman through the rough and hilly moors, is always the unalloyed instinct of sport, and that he is not equally attracted by the recreating invigorating air of the hills, untainted by the breath of his fellow man, or the reek and smoke of myriads of chimneys?

Outdoor games also conduce to health by the muscular exercise they afford. In order to understand the importance of exercise in the preservation of health, I may compare the organic system to a pool of water, whose purity and wholesomeness are maintained by a feeding

stream at one end, and an outlet at the other. The outlet represents exercise, and the feeding stream the process of nutrition. Without exercise there would be no loss, and consequently no necessity for renewal; and without renewal there would be stagnation, corruption, and disease, instead of pure sparkling flowing health.

Fresh air and exercise naturally go hand in hand, as helping and abetting each other in invigorating and refreshing the physical and mental powers.

One of the effects of alcoholic indulgence is said to be that it checks waste of tissue, economizes food, and promotes stoutness. Many people therefore argue that alcohol occupies a high place as a nutritive agent. It is exactly this property of alcohol, however, that is fatal, on account of its treacherous nature. Whatever prevents normal waste of tissue, banks up the main outlet of the organism, stems the tide of nutrient, and renovating cells, and breeds disease and degeneration in the stagnant system. In youth and childhood we find decay and renewal proceeding with the greatest rapidity, and therefore the organism is maintained in a state of freshness and beauty, and health, which gradually decline as age creeps on and nutrition becomes torpid. A secondary advantage

derived from active circulation and muscular exercise, is the increased action of the skin. Both sensible and insensible perspiration are promoted by exercise, and in the current of excretion thus stimulated, are swept away much of what the ancient physicians would call humours. Free perspiration in the open air, however, has the disadvantage of increasing the risks of chills and catarrhs, which must be met by proper precautions in the matter of clothing. Flannel when worn next to the skin is both cool and comfortable, as it absorbs the exhaling moisture, and is an efficient safeguard against chills. We must be especially on our guard when attempting to take part in outdoor games, under the influence of some depressing emotion, as it both increases the liability to get overheated through deficient nervous control over the cutaneous arteries, and renders us more liable to catch cold, on account of the temporary failure of the nerves to resist the influence of a chill. Mere nervousness, or shyness in the playground is enough to cause the unhappy victim to get uncomfortably hot and contract a chill, and a person irritated and out of temper at playing badly and being beaten, may similarly depress his nervous system, and render himself a prey to catarrh. On the same principle, we must avoid pushing exercise to the verge of fatigue;

as beyond a certain limit, exercise ceases to be a recreation, and acquires the character of a depressant, producing the fearful train of evils that are associated with nervous exhaustion. Young women with as much enthusiasm perhaps for lawn tennis as young men, but with less endurance and muscular power than the latter, are especially to be warned against being carried away by their ardour, and permanently injuring their constitutions with intemperate indulgence in their favourite exercise. The revulsion which not infrequently follows an unusually active season, especially in girls of indomitable spirit, but indifferent nervous power, is exhibited in palpitations, faintings, low spirits, irritability of temper, sleeplessness, indigestion, skin eruptions, and various other affections.

A special advantage in the exercise and fresh air obtained by outdoor games is that they are associated with a definite pursuit or object, whereby the mind is entertained and pleasantly occupied, while the body is being exercised and the blood purified. A more dejected or miserable object one can scarcely conceive, than the man who creeps out of his house, with no other object than a conscientious pursuit of exercise, and walks about against his inclinations with a feeble undecided purpose, and having accomplished the imbecile feat and appeased his conscience, returns more lugubrious than ever,

wondering that his "constitutional," as he calls his sop to conscience, has not dispelled his atrabilious mood and saturnine imaginations.

Outdoor games exactly supply the element which contributes to make exercise and fresh air in the highest degree conducive to health and enjoyment, by adding to them a definite subtle purpose, and calling the mental powers into purposeive methodical action.

It does more than this. It trains the eye, the hand, the powers of reasoning, to quickness and precision. It calls forth the virtues of courage, readiness, and presence of mind, and teaches us to practise magnanimity and generosity, while contending for victory. What are these but the great characteristics of the Briton in their cradle? Our outdoor games and pastimes have contributed not a little to make the Briton as Goldsmith describes him :—

> " Stern o'er each bosom, reason holds her state,
> With daring arms irregularly great.
> Pride in their port, defiance in their eye,
> I see the lords of human nature pass by;
> Intent on high designs, a thoughtful band
> By forms unfashioned, fresh from Nature's hand :
> Fierce in their native hardiness of soul,
> True to imagined right, above control :
> While e'en the peasant boasts these rights to scan,
> And learns to venerate himself as man."

CHAPTER XXXI.

THE SKIN AS A MULTIPLE ORGAN.

Of all the structures and organs of the human economy, that which occupies the foremost place in importance is undoubtedly the skin. Although many other members are essential to life and health, the skin nevertheless ranks first by reason of its varied functions and multifarious offices. It is not merely a tegument or protective covering to the underlying tissues. It is a veritable organ, as much as the liver, lungs, or kidneys, exercising the functions of secretion, excretion, and absorption, as perfectly as any organ in the body devoted to those offices, and are just as essential to life and the general well-being of the organization. It is, moreover, the chosen organ of the special sense of touch.

If we doubt the importance of the skin as an organ of excretion, for instance, and if we find it hard to believe that suppressed perspiration is as serious a matter as impeded respiration, and that we might as well suffocate ourselves with want of air or directly stop the

action of the heart, as dam the incessant tide of exhalation flowing through the skin, we may soon convince ourselves by experiment. If we cover any considerable area of the skin with an impermeable varnish, so that perspiration shall be entirely prevented, the obstructed exhalation will be followed by diminution of the chemico-vital processes, giving rise to headache, lassitude, and febrile reaction. If these warnings are unheeded, the heart and lungs become engorged with blood, the system is poisoned with the retention of effete matter in the circulation, and death ensues. In cases of burns, the danger is always in proportion to the extent of skin involved, and not the depth of tissue destroyed. It is the injury to the sweat glands, those minute apertures in the skin through which the blood cleanses itself, that are most dreaded in such accidents, compared with which, bone and muscle and fat are of secondary importance only, and would be, if the surgeon had his choice, gladly sacrificed to the destructive element, in place of the cutaneous surface so richly studded with these depurating agents. Every square inch of skin, which has its sweat glands obliterated, is disabled for ever, without hope of repair or renewal, and perceptibly augments the danger arising from retention of deleterious matter in the blood. The fatal issue in cases of severe

burns is usually heralded by intractable diarrhœa, a symptom which indicates the impermeable condition of the skin produced by destruction and obliteration of the glandular apparatus in its substance, and the vicarious excretion by the intestines. As, however, the latter cannot go on for ever doing the work of the skin as well as perform its own functions, the subversion of order speedily ends in death. The moral of so much physiology of the skin is, that in burns or scalds the gravity of the accident depends on the extent of superficial area involved, and that diarrhœa, when it sets in within a week or ten days from the accident, is a symptom of the worst omen. We shall have more to say further on with regard to excretion by the skin.

Absorption through the Skin.—The skin is also endowed with the power of absorption. Whether this takes place solely through the sweat glands, or by the other parts of the tegument as well, appears to be a matter of conjecture. There can be little doubt, however, that it is effected principally by the ducts which throw out the perspiration, viz., the sweat glands. If the skin did not possess this quality, the use of liniments, lotions, and ointments could not be resorted to in medical practice, and local applications of any kind would be useless. Persons may be speedily brought under

the action of mercury by means of inunction, that is by the mercury being rubbed on the skin in the form of ointment. As a matter of fact, this method is frequently resorted to in medical practice, in the case of young children or infants, when it is found necessary to eradicate certain congenital taints of the blood. A lump of mercurial ointment about the size of a pea is daily rubbed into the skin of the armpit, where the sweat glands are very numerous, until the desired result is attained. The effect is the same as when the drug is administered by the mouth, though more gradually induced. Similarly, when children are averse to taking cod liver oil by the mouth, it may be, and is occasionally administered by employing friction with it on the skin of the abdomen. The difficulty is thereby surmounted, and all the beneficial effects of the oil are undoubtedly, though less rapidly, secured. Children who are habitually costive, are also frequently cured by abdominal frictions of oil and other aperient substances. The absorbent power of the skin, however, without the aid of friction is hardly appreciable. Poisonous substances, for instance, when merely brought into contact with the skin, do not affect the system, though if heat be employed, and the agent be continuously and liberally applied to the skin, it will often be rapidly absorbed. In this way

I have seen a patient narcotized to an alarming degree, by the application of poultices dressed with laudanum. The friction employed in rubbing liniments and similar applications serves two purposes. It forces the substance into the minute orifices of the sweat ducts, and thus affords a mechanical aid to absorption, while, at the same time, the heat produced by friction stimulates the blood vessels to increased action, and favours absorption by inducing a vital action. Soap or oil is an ingredient in almost every liniment, because it facilitates friction, while camphor or ammonia is frequently added on account of its adaptability to stimulate local circulation. To these is added the specific drug to be absorbed, such as opium, belladonna, aconite, etc.

Regulation of Animal Heat by means of the Skin.—Another important function of the skin is the regulation of the body temperature. The cutaneous surface is, so to speak, the mediator between two conflicting agents, the blood and the atmosphere, for maintaining an even temperature in the former. The blood is constantly exposed to influences which, but for the action of the skin, would keep its temperature in a state of perpetual fluctuation. Every meal of which we partake, every movement of a limb, would raise the temperature of the blood, while exposure to the cold, or muscular inaction, would

tend to lower it. Through the intervention of the skin, however, we are happily maintained at a temperature that, normally, does not vary half a degree, though the vertical rays of a tropical sun beat on us, or though the icy hand of winter reigns. Whether we undergo severe bodily exertion, and burn so much fuel in the shape of muscular fibre and glandular substances, or whether we languish in indolence, provoking as little vital combustion as possible, our temperature is the same. The negro "panting at the line" does not possess warmer blood than the inhabitants of the Arctic regions. In fact it is possible to live for a short time in an oven, with the blood at its normal temperature, as well as make one's home in the floes of the polar seas, through the great service rendered by the skin as a regulator of the temperature. When the temperature of the blood is raised by external heat, the same influence acting on the blood vessels of the skin, stimulates the circulation in them, and induces increased perspiration, the evaporation of the moisture on the surface having the effect of reducing the temperature. On the other hand, cold has the effect of driving the blood away from the skin into the deeper parts, preventing exhalation, and husbanding the warmth of the body.

The skin exercises the functions of both lungs

and kidneys, as it exhales carbonic acid as well as water. These three organs have a mutual understanding among them, and work together for the common good with the greatest harmony, serving as collateral channels of excretion to one another, when one or other of them is prevented from adequately fulfilling its own function. Thus in cold weather, when the action of the skin is prevented for the regulation of animal heat, the kidneys do the work of the sweat glands, and the activity of the kidneys in cold, damp weather is a matter of common observation. On the contrary, when the skin is in full work in the warm summer, the kidneys are inactive, most of the moisture of the blood being carried away by the sweat glands. In some diseased condition of the kidneys, when these organs are disabled from doing their full work, sweating is a frequent symptom. The lungs are also employed to relieve the kidneys, and often suffer severely in consequence. The skin also suffers from its vicarious labours, the elimination of renal excretions not being suited to its tissues, and therefore skin affections are a common accompaniment of Bright's disease of the kidneys.

The skin being such an important organ, the care of it becomes a duty, which no one who values health can afford to neglect or treat with indifference.

CHAPTER XXXII.

THE SKIN UNDER THE MICROSCOPE—THE EPIDERMIS.

LET us now turn our attention to the structure of the skin, the scene of the various operations referred to, with the elaborate apparatus employed in conducting them, as revealed by the microscope.

What an impetus has the invention of the microscope given to science and natural religion! To the anatomist, physiologist, physician, and analyst of to-day, the microscope is a simple necessity, without which the work of serious research and study would be impossible. The student of Nature, who worships the Creator through His works, is led by the contemplation of the new realms and beings which the microscope reveals to his astonished view, to pay greater homage to the majesty and wisdom of the Divine mind. He accepts them as fresh evidence of the intelligence, the providence, and beneficence of the Creator; those worlds within worlds of crowding organisms, unknown till the discovery of

the microscope; countless millions of beings, obeying the same conditions of life and governed by similar laws to those which regulate tangible beings, going through the same revolutions of birth and life and death, suddenly summoned from vacuity, and submitted, in the act of performing their routine of existence, to his observation. So also, structures like the skin, apparently destitute of interest to the naked eye, unfolding from their smoothness and homogeneity, a wealth of contrivance and variety of design, exalt our ideas of the framer of the fabric. All honour also to those discoverers, who, like the immortal Harvey, have revealed and brought to light the exquisite plans of the Creator. What a clumsy organ had the heart been before the discovery of the circulation, and what a purposeless elaboration of detail had been wasted on the structure of the cardiac valves, the distribution of the blood-vessels, and the other minutiæ of the circulatory apparatus. How exquisite, how superb is that apparatus to-day, perfected by new discoveries since the days of Harvey; missing blocks supplied from time to time, and the grand puzzle at last unravelled and brought to its completion! There are still many blank charts of the organism to be filled in by future discoverers, regions as yet explored by the dim light of

surmise and conjecture only, to wit, the convolutions of the brain, and that mysterious organ the spleen, which physiologists approach and treat, as the priest and the Levite treated the wounded man—they pass it by.

The skin is made up of two parts or layers,—the upper, known as the "scarf skin," "cuticle," or "epidermis," and the under "true skin" or "derma." These two parts, while together forming the skin, are individually structures of very different characters. The epidermis is composed of a hard, horny, callous structure, utterly destitute of nerves and blood-vessels, while the true skin is a soft, elastic material, packed with glandular organs, rich in blood-vessels, and highly endowed with nerves. The epidermis may be torn or cut without inflicting the slightest pain, and without giving rise to any bleeding, while the contact of a pin's point with the tender, quivering substance of the derma, is enough to draw blood and excite acute pain. The very antagonism of their characters, however, is the bond of partnership between the two layers of the skin. Hard and unfeeling in itself, the epidermis could not form any portion of the external organ of touch, or even nourish itself, without its close alliance with the true skin. Although the surface is everywhere mailed in this epidermic armour, devoid of nerves, it is nowhere dull to the sense

of touch. The tiniest fly crawling with gossamer feet on your skin, or the faintest breath of air fanning the surface, is instantaneously flashed to the brain. Moreover this structure, though nerveless and bloodless, yet lives and thrives. Lying on a hot-bed of nerves and vessels, such as the true skin, the epidermis draws its nourishment by imbibition from that structure, and is fed and clothed by it, so to speak, in return for its services as a protector and shield to the more sensitive and tender derma. These two layers, therefore, though of different types, are admirably suited to each other for the purpose of forming a joint covering to the body, which shall serve the purposes of sensation as well as protection. The epidermis serves to impart the requisite degree of bluntness to the nervous perception of touch. It is a sort of buffer interposed between the sensitive nerve fibres and the rough substances with which the skin daily comes into contact, without which the jars and shocks that we would experience would be unendurable. Sensation would be exaggerated into exquisite pain, the merest touch would cause us to start, and the very friction of the clothes on our body would annoy and irritate us. The epidermis is not evenly distributed over the surface, but is thicker in those regions which are exposed to friction and pressure, such as the palms of the hands and

soles of the feet. The more a part is used, and the more pressure it is subjected to, the harder and hornier does the epidermis over it grow. Thus we see that the hands of the labouring classes are hard and rough, while the palms of the upper classes are smooth and soft.

Structure of Corns.—Corns are nothing more than hardened epidermis, brought on by the pressure of tight boots. It will be naturally asked, why then are corns so proverbially painful, when the epidermis is a callous, nerveless structure? It is not the corn that is painful, as may be seen by the fact that it can be pared with a knife without causing the slightest suffering; but it is the pressure of the dense hard body on the nerves beneath that excites the pain. The corn, in fact, is a foreign body, causing irritation by its constant pressure on the tender tissues beneath. The epidermis serves another useful purpose in limiting the evaporation of moisture from the skin. If we were deprived of the cuticle, the moisture of our tissues would be rapidly lost in the form of perspiration, and our bodies would be speedily converted into lean, dried-up mummies. The restraining power of the epidermis on evaporation is remarkably shown in dead bodies exposed to the air, the portions which may be accidentally denuded of their cuticle drying up and hardening in a remarkably short space of

time, while the other parts retain their softness and suppleness for a much longer period.

Pigment.—The pigment or colouring matter of the skin is found immediately beneath the cuticle, forming its deepest layer as it were; so that beneath this structure, the great difference between the white and the coloured man disappears. Here also lies the material which distinguishes the blonde from the brunette; and there is therefore some scientific force in the observation, that beauty is only skin deep. By an occasional freak of Nature, there is no pigment whatever present, and the skin assumes a sickly white hue. People who are born with this defect are termed *albinos.* The term was first applied by the Portuguese to the white negroes they met with on the coast of Africa. The pigment is also absent in the iris of the eye, which presents a peculiar pinkish colour. It is said that Albinos are generally weak-minded, and without exception their eyesight is weak and deficient. The most remarkable curiosity, however, in regard to the pigment, is afforded in the disease called Addison's disease, an affection of certain small organs connected with the kidneys, and termed *supra-renal capsules*, in which the skin of the person affected undergoes extraordinary discoloration. In the words of Dr Addison, who was the first to draw attention to the disease and its symptom:—" It

may be said to present a dingy or smoky appearance, of various tints or shades of deep amber or chestnut brown, and in one instance the skin was so universally and so deeply darkened, that but for the features, the patient might have been taken for a mulatto." The sun's light and heat, wind and moisture, darken the pigment and produce the tanning so frequently acquired in summer by exposure to these influences. We are accustomed to associate a tanned face with health and vigour ; and the bronzed countenances of seafaring individuals and holiday-makers at the seaside are confirmatory evidences of the traditional idea. Disease is, however, no impediment to tanning, provided the subject of it is not debarred from the influences which favour the deposit of pigment. Invalids suffering from chronic disorders, such as consumption or confirmed dyspepsia, and seeking health in prolonged exposure to the sun and sea air, often present the most marked instances of tanning, though when accompanied by wasted features and a dejected countenance, the bronzed face is far from being an indication of health.

The condition of pregnancy is also accompanied by increased pigmentation in the areola round the nipple of the breast. The skin of this part, which is usually a pinkish hue, or light brown, according as the complexion of the

female is fair or dark, acquires in pregnancy a rich deep brown colour, and some stress is laid upon this phenomenon in the diagnosis of pregnancy.

The spots on the face, which so often blemish the face of blondes, and which are known as freckles, are also due to the caprices of pigmentation, the colouring matter being deposited in circumscribed specks and spots. In some cases freckles may be removed by judicious medical treatment. Many of the so-called "mother's marks" are also instances of erratic pigmentation.

CHAPTER XXXIII.

THE TRUE SKIN OR DERMA.

THE true skin is a tough elastic membrane, well adapted as a protective covering to the internal parts. It rests on a bed of fat, on which it moves freely, while the fibrous material from which it is woven gives it great strength and flexibility. The immense resisting power of the skin is well shown in some instances of gun-shot wounds, where cannon shot and other heavy projectiles, weighing as much as twenty-four pounds, have been found imprisoned in a pouch of skin, from failure to force their way out again after entering the body, despite their enormous weight and comparative velocity. It is also flexible and elastic, readily adapting itself to the irregularities of the surface, and the movements of the body and limbs. In horses and cattle, the skin is furnished with muscular fibres, by means of which they are able to produce a peculiar tremulous motion of the surface, for the purpose of driving away flies and other insects which torture them.

There are numerous structures embedded in

the true skin, such as the sweat and fat glands, the hair follicles and the papillæ or tactile organs, which we propose to examine minutely, in order to acquaint ourselves with all the functions of the skin, and to understand future references to them, when we come to speak of skin diseases.

The writer has endeavoured in these pages to avoid the mechanical method of teaching, and laying down doctrines, without preparing the reader beforehand to understand and appreciate them. He has attempted to show that medicine is not a mysterious art, but a plain, rational system, founded on correct principles. The quack makes a magic lantern or peep show of the beautiful light of knowledge and truth, which shuns the confined caverns of mystery and empiricism, longing to flood the world with its broad beams, and embrace the universe in its catholic glow. The quack is ravished with the homage of an ignorant populace, and delights in concealment and mystery. The kings of science, the giants of discovery, never for one moment thought of concealment or mystery. Regardless of self, and impelled by the passion for truth, they worked and worked, digging and diving for the precious gem, undaunted by obstacles, amid the clatter of abuse and the privations which generally attend unselfish and ingenuous zeal. It is the peculiar misfortune of these

heroes to meet with opposition, to have calumny and every conceivable indignity flung in their path, to have their virtues suppressed, their failings magnified, and their every word and action misconstrued. Fortunately for an ungrateful world, their miserable, ungenerous tyranny is impotent to hold back the fierce earnest spirit of truth, before which the effigies of sham and imposture, propped up for ages by error and superstitious conservatism, slowly fade and crumble into dust.

The greatest benefactor of the age, who has at last discovered a true specific for a horrible fatal complaint, who might have speedily made his fortune, did not deign, for filthy lucre's sake, to trade on his marvellous discovery. He gave his secret to the world of science, as soon as it was matured by experiment. He did not conduct his operations with closed doors, but in the presence of all who chose to witness them. He made no mystery of it, but delighted to explain the process of inoculation, and the subtle ingredient with which it was done. And yet we find a strong disposition prevailing in many high quarters to grudge him even the empty thanks of humanity, by throwing doubts on his system, and endeavouring to lower it in the eyes of the public. There are instances in the history of medical science, of paltry minds which stooped to secrecy for

commercial reasons, and enriched themselves at the cost of humanity, handing down their secrets from father to son; and their names, though associated with some of the most valuable inventions and discoveries, are branded with an immortal stain, which time will only serve to deepen and intensify. The educational tendencies of the age are happily fast dispersing that autocratic personage, who, whether in the garb of priest or physician, assumes the air of the absolute monarch, and reigns with an imperious hand, brooking nothing but servile unquestioning obedience. We live in the days of manhood and liberty, when the bibles of science and literature are not chained to the desk, but are circulated far and wide, and brought by cheap publication within the limits and means of every class. No one need be illiterate in this age, except from choice. No one need remain in the thraldom of ignorance, if he honestly desires the freedom which knowledge and learning confer.

Sweat Glands.—Let us now examine a sweat gland. What kind of a structure is this, through which such important excretions are strained from the blood? It consists of a minute tube closed and coiled up at one end, the end which is embedded in the fat below the skin, and terminating at the other end by an orifice in the scarf skin. The inter-

mediate portion traverses the whole thickness of the skin in a spiral form. This, then, is the whole construction of a sweat gland. The blood-vessels crowd round the coiled-up end, and readily part with their water and other excretions, which enter the tube, and are discharged through the orifice on the surface, in the form of vapour or water, according to the hygrometric condition of the atmosphere and other influences. A square inch of the skin of the palm contains about 2800 of these orifices or *pores*, as they are popularly called. They are also very plentiful in the arm-pit and the sole of the foot, but are less numerous on the back and the trunk. There are altogether nearly 3,000,000 distributed over the entire surface of the skin, and the collective amount of moisture that passes through them in the form of water and vapour is about an imperial quart, or forty ounces, in the twenty-four hours. It seems almost incredible, but is nevertheless a fact, that the fluid exhaled through the skin is equal in quantity to that secreted by the kidneys, and that the perspiration is produced almost measure for measure to the urine passed from the bladder.

Sensible and Insensible Perspiration.—It must not be forgotten, however, that the skin is always perspiring, that the process of exhalation through the numerous apertures is con-

tinually going on, and that the three million tiny suction pumps are constantly at work drawing moisture from the blood. As a rule, however, the moisture undergoes evaporation as fast as it reaches the surface, and the perspiration becomes what is called *insensible.* When from any cause, such as great heat, exercise, or the use of certain drugs, the sweat is produced too rapidly, or in too great quantities for evaporation, it gathers on the surface in the form of a liquid, and is then called *sensible* perspiration. Evaporation is also retarded by the stillness of the air and a moist atmosphere. The most favourable conditions for producing sensible perspiration are heat combined with stillness and moisture of the atmosphere. The use of waterproof clothing tends to interfere with healthy evaporation from the surface, and hence the proverbial unhealthiness attaching to mackintoshes and goloshes. Dry air is favourable to evaporation. It is possible to maintain life for a limited time in an oven, owing to the fact of dry air favouring evaporation and maintaining the ordinary temperature of the blood in spite of the excessive heat. If the air in an oven were moist, the blood would rise in temperature and speedily produce death, the only means of cooling it, viz., by evaporation of moisture from the skin, being cut off.

Diaphoretics, or Medicines which increase the Action of the Skin.—There is a class of medicines which have the property of increasing the action of the skin, and they are called in medical language *diaphoretics.* Dover's powder is one of these. It is composed of ipecacuanha, opium, and sulphate of potash. Antimony, ammonia, camphor, and pilocarpin are also diaphoretics. Coffee is said to diminish perspiration.

Behaviour of Sweat Glands in Fever.—The sweat glands are controlled by nerves, certain impressions on the latter stimulating the glands to active secretion, and others retarding or suppressing their functions. In fevers, it is supposed that some unknown poison circulating in the blood perverts these nerves in such a way as to produce suppression of the sweat. Evaporation being thus prevented, the high temperature characteristic of fever is induced. In the treatment of fevers, therefore, our chief object is to restore the action of the skin, and with this end in view, we prescribe medicines to induce diaphoresis, or sweating.

Effect of Depressing Emotions on Sweat Glands.—There are other causes besides drugs capable of influencing the sweat glands. Depressing emotions, such as fear, sensations of faintness, or a feeling of sickness, are, as everyone knows, powerful agents in inducing the

sweat glands to pour out their secretion. Consumptive patients are often troubled with night sweats, due to the depressed state of the nervous system in this disease, the sweat becoming sensible at night by the impediments to evaporation offered by the bedclothes. Similarly, persons with feeble, irritable nerves break out into profuse perspiration on the slightest exertion or exposure to heat.

A Chill.—When we come to consider the large quantity of secretion which daily escapes through the skin, and the fact that carbonic acid and urea—two substances highly poisonous to the blood—are among the substances contained in the exhalation, we cannot wonder at the importance attached to free perspiration, and the evils which attend its suppression. We are now in a position to understand the meaning of the word "a chill," so often in the mouths of people, viz., the sudden suppression of the action of the skin, and the consequent deflux of perspiration to some internal organ, usually ending in congestion, catarrh, or inflammation of that organ.

CHAPTER XXXIV.

ORIGIN OF SKIN DISEASES.

THERE is a certain amount of justifiable pride attached to the possession of a clear and spotless skin. Cutaneous eruptions are vaguely associated in the popular mind with deformity, impurity, and contagion, and instinctively it shrinks from the slightest appearance of disease of the skin. We are apt to regard abnormal conditions of the surface in others with suspicion and distrust, and to accept our own afflictions of the kind with some degree of humility and diffidence. It is a common medical experience to hear patients seeking advice for cutaneous affections, anxiously repudiating previous acquaintance with such disorders, and bewailing their first fall as a defilement and blotch on the fair escutcheon of the family skin.

In many cases, no doubt, the odium attached to these affections is well founded and justifiable. Ringworm, for instance, is highly contagious, besides being unsightly and repulsive. The disease called *scabies*, or itch, is even more objectionable, the mere mention of its name

being tacitly forbidden in society. Other forms of skin disease, in all their grades of hideousness, are the simple evidences of vice and degradation. But there are others which may be simply the result of nervous disturbance, or the secondary effects of disease in some other eliminatory organ, and consequently bear a very different interpretation and character. We shall now proceed to examine the causes of skin disease. There are three great sources of disease of the skin—the blood, the skin itself, and the nervous system.

Causes originating in the Blood.—If there be any unwholesome material circulating in the blood, the skin, as an important part of the blood-cleansing system, is very liable to be affected by its labours, in the same way that human beings are apt to be affected by unhealthy occupations. The morbid material may be acquired in many ways. It may be hereditary as in cancer. It may be some specific poison such as that of scarlet fever, measles, small-pox, or typhoid, each of which produces its own distinct rash, by which the disease is recognised. It may be a mere accident, as in the case of blood-poisoning. The mere exhibition of certain drugs is often sufficient to produce a copious and characteristic eruption. Bromide of potassium, when administered for any length of time, usually produces an erup-

tion of peculiar muddy-brown pimples in various parts of the skin. Arsenic similarly produces swelling of the face, brown spots and blotches of the skin, when injudiciously administered. The use of copaiba is attended by a form of nettle-rash. Henbane, belladonna, and stramonium will occasionally produce a wide-spread blush, while chloral, opium, morphia, and salicylic acid are each capable of producing peculiar rashes. Similarly, indulgence in certain articles of diet, such as nuts, cucumber, and shell-fish, is followed in many persons by well-marked nettle rash. Again, impurity in the blood may be caused by the inability from disease of other excretory organs, such as the kidneys, to dispose of their own excretions. The skin coming to the rescue, and endeavouring to get rid of the offending material, suffers injury in the attempt. Thus, disease of the skin is frequently associated with confirmed dyspepsia and Bright's disease of the kidneys. The skin may also suffer from insufficient supply of blood to the surface, through impediments to the circulation from disease in other organs, such as the liver, it becoming dry and harsh and liable to inflammation and suppuration on the most trifling injury. The association of dropsy with this characteristic form of skin is thus familiar to the observation of physicians. The impurity of the blood may be

simply its poverty, lacking the necessary ingredients for supplying the skin with healthy nutrition, and disease may follow in such a case from a purely negative cause. On the other hand, the blood may acquire offending material from the opposite cause of plethora, and contaminate the skin by sheer excess of nutrition. Both these effects may be observed in children, those of the poorer classes, who are insufficiently fed, being subject to low forms of skin disease, while their more fortunate fellow-sufferers in the higher spheres, with every want more than supplied, pay for the opposite violation of nature's laws, by painful angry-looking boils, which absorb the redundant energy evolved by the metamorphosis of food.

Causes originating in the Skin itself.—The second great source of skin disease is the skin itself. In some cases, parasites, both animal and vegetable, lodging and breeding in the substance of the skin, excite irritation and produce disease. The variety known as *scabies*, or itch, is the result of an animal parasite, which tunnels its way from one spot of the skin to another, depositing its eggs as it goes. Ringworm, again, is an example of the vegetable parasite. Local irritants of various kinds produce eruptions, such as lime, sugar, flour, and washing soda, producing respectively, bricklayer's, grocer's, baker's, and washerwoman's

itch. Contact with nettles produces the well-known stinging rash. Insufficient clothing, the use of flannel next the skin, want of cleanliness, are all more or less irritants to the skin and capable of inducing disease in it. Defective states of the sweat glands are also a source of skin disease, causing excessive, diminished, or perverted secretion of sweat. The "red gum" of infants, which is an eruption of soft red pimples about the arm and face, is a result of excessive sweating, due to overheating and wrapping up of the child, or to the free sweating induced by rickets and certain forms of intestinal derangement. The peculiar scab-like persistent eruption on the scalp, so common in infants, and also the well-known prickly heat of tropical climates, are due to the same cause.

Causes originating in the Nervous System.—The third great source of skin disease is the nervous system. It must be borne in mind that the nervous supply to the skin consists of the extreme terminals of nerve fibres, and that if any deficiency or disturbance affects the general nervous system, the parts lying most remote from the central supply, and supplied by the extreme ends of the nerves, will be the first to suffer. In the matter of blood supply also, the skin is the last to be served, it being irrigated by the blood vessels most remote from

the heart, and consequently the first to suffer from any impediment to the circulation. Hence, persons affected with heart disease are generally of a bluish or purplish hue of skin, indicating imperfect aeration of blood. The nails are even worse off than the skin in this respect, as they have no blood vessels nor nerves of their own, but depend on the skin for their sustenance. Thus, the nails in consumptive patients are ill-formed and clubbed, often furnishing evidence in themselves of the presence of the disease. The association of chronic and obstinate cases of skin disease with extreme constitutional nervousness, is one of common occurrence, and every physician recognises the hopelessness of treating such cases, without taking measures to build up the nervous system while using local remedies. A striking instance of skin disease from nervous disturbance is afforded in the disease called "shingles," which consists of clusters of vesicles making their appearance in the track of a nerve, notably in that of one of the nerves between the ribs, forming a half girdle round the body. The peculiarity of the eruption is, that it rigidly follows the course of the selected nerve, from its root at the spine, to its termination in front of the body, accompanied by severe neuralgia of the affected nerve. It strictly confines itself to the one side, and never encroaches on the corresponding nerve in the

other half of the body. I have, in one or two instances, won the coveted confidence of patients by my prophetic limitation of the course of shingles on its first appearance. The clusters of vesicles so frequently seen about the lips of some persons on every slight derangement of health, especially during stomach disorders, belong to the same class of disease as shingles, and is of nervous origin. The skin affections to which infants are commonly subject during the period of teething, are another illustration of eruptions derived from disturbance of the nervous system.

CHAPTER XXXV.

THE SKIN AS THE ORGAN OF TOUCH.

BESIDES being richly endowed with sensibility, which is a general sensation, the skin possesses special faculties as the external organ of touch. These two functions must be carefully distinguished, as their entirely separate characters are proved by the presence of distinct organs discharging their respective functions, without dependence on, or interference with, each other. If my skin is pinched, I am made conscious of the fact by agencies entirely different from those which enable me to form a correct judgment as to the shape, density, consistence, &c., of a substance, without the aid of my visual organs. In the one case, the sensation is a general one, which every part of the skin surface is more or less capable of receiving, and the impression is received and conducted by sentient nerves. In the other, I make use of a special faculty, the sense of touch, for the exercise of which, special apparatus is supplied to the skin, or to such parts of it as are by Nature chosen to be its external organs.

Let us examine the special apparatus by which the tactile sense is exercised.

The Tactile Sense.—On examining the true skin with the aid of a powerful microscope, certain little bodies of conical shape may be seen lying embedded in its substance; little pyramids with their apices pointing upwards, and projecting into the epidermis, and their bases resting on the surface of the true skin. These papillæ are liberally supplied with blood, from minute arterial ramifications, which form quite a vascular network in its substance. Wherever there is fine nervous function required, there must be, as an indispensable condition, a plentiful distribution of blood. The brain, the highest organ of nervous function, is intersected in every direction by blood vessels of enormous calibre, and arteries ramify in its substance with apparently lavish liberality. The brain, however, requires all the blood which it gets. Deprive it for one instant of the free supply of blood coursing among its substance, and immediately its functions are extinguished. During one brief moment, that the pressure of effused blood on the brain in apoplexy causes a partial stoppage of its circulation, the mental and physical powers are suspended, and the individual falls down unconscious. A slight flagging of the heart's action, causing an insufficient flow of blood

through the brain, is sufficient to plunge the being and all his faculties into instantaneous oblivion, and for the time being he is a dead man, as far as consciousness and volition are concerned. Did the spinal cord share in the embarrassment of fainting, we might not hope for speedy or certain recovery from ordinary fainting fits. The functions of respiration and other vital operations are happily conducted irrespective of the brain, but if the nervous centres which controlled these were all simultaneously affected during a faint, the probability is that fatal effects would generally follow.

The nervous arrangements in the papillæ are most elaborate. Their variety and complex character have puzzled the greatest physiologists. In some cases, the nerve terminations are wound round in the papillæ in a spiral manner. In others they end in small oval bodies of various descriptions. Whatever their shape or structure, however, there is no doubt as to their function as directly bearing on the sense of touch. In some way or other, not yet defined nor correctly classified, the different structures in the papillæ are probably connected with the specific sensations of locality, pressure, temperature, &c., into which the sense of touch may be resolved. Deep and learned though scientists are, there are yet in the simplest structures of Nature's handiwork, many things

which puzzle them, many apparently insignificant parts which defy their best efforts to explain. How much of our scientific creed of the present day will be standing in the dim future, and how much will be swept away with the errors and misconceptions which new light annually reveals, who can tell ?

The palmar aspect of the hands and fingers are *par excellence* the organs of touch, and the papillæ in these regions are therefore well developed and thickly distributed. They can be seen by the naked eye here as elevated ridges arranged in parallel rows and concentric circles. A similar arrangement is also seen on the soles of the feet, which are only second to the hands as organs of touch. The tactile sense in elephants is located in the extremity of the proboscis, the nerve which feeds it being said to exceed in size the united volume of all its muscular nerves. The tongue in man is also highly endowed with tactile sense, and in fact ranks first as an organ for judging of the specific sense of locality. The method of testing the delicacy of the sense of locality is to apply the two points of a compass to the surface to be tested, and find out the nearest distance at which they give rise to distinct sensations. Tested by this method, the tongue is twice as delicate as the tip of the middle finger, four times as delicate as the tip of the nose, and eighteen

times as delicate as the under surface of the great toe. In paralytic patients, medical men are accustomed to draw important inferences from the application of this test, the loss of this sense indicating serious failure of the nervous centres, and its gradual return giving hopes of recovery. In remote country districts, it is to be feared that these elaborate methods of diagnosis are not much appreciated, and in one interesting case where I daily used this test, substituting a pair of old scissors for the points of a compass, I was dismissed as a trifler who amused himself experimentally pricking his patient's legs with the points of shears. On another occasion, when I had to do with a very different kind of patient, whose faith in medicine was stupendous, I nearly lost my clinical thermometer by his anxiety in a moment of impulsive zeal to swallow the precious little instrument. Fortunately, he declared his intention of doing so, and I was just in time to save both the thermometer and the patient. I have never since had the courage to take a patient's temperature by placing the bulb of the thermometer under the tongue, but am content with the next best method of placing it in the armpit.

Sense of Temperature.—Another specific sense included in the sense of touch is that of judging temperature. The skin is no judge whatever

of absolute temperature, though it is quick to detect changes from cold to heat or *vice versa.* The skin is only capable of estimating relative temperature, and all our ideas of cold and heat are decided by comparison, and also to a great extent by the state of the blood vessels of the skin. A tepid bath, for example, would be considered decidedly warm, if we got into it immediately after coming out of ice-cold water. On the other hand, it would feel absolutely cold if we entered it after having been previously immersed for some time in very hot water.

If again we produce an agreeable glow of heat in our body by moderate exercise previous to a cold bath, the shock of the latter will not be so great as when we proceed to bathe after standing about and getting cold. The explanation is, that in the former case the blood vessels of the skin are full, conveying a sensation of warmth to the surface, and enabling it to resist the shock. In fevers the vessels of the skin are empty, and consequently, although the blood is several degrees higher than usual, a feeling of chilliness and cold prevails. I can imagine nothing more dangerous than a cold bath in the winter season, if the bather is naturally of feeble constitution, does not prepare himself for the shock by previous moderate exercise, and is suffering at the same time from mental depression. It is a delusion to imagine that

cold bathing in such cases acts as a tonic to the nervous system.

When heat and cold are extreme, the skin seems to lose the faculty of distinguishing between the two, and instead of giving rise to sensations of different temperatures, they simply excite feelings of pain. Thus, if the hand is thrust into a freezing mixture of very hot water, it is difficult to say whether the sensation is one of cold or heat, pain being felt in both cases.

The fingers, which are perfect as tactile organs, are not equally useful in gauging temperature, some other parts of the skin, such as the cheek and the chest, taking precedence of them in this respect. Thus nurses are in the habit of testing the heat of a poultice, by holding it to their cheek before using it on the patient. Also in preparing hot baths for children, they do not trust to their fingers for ascertaining and regulating the temperature, but dip their elbow or immerse the whole forearm for that purpose.

Sense of Pressure.—The skin has also some power of judging pressure, apart from the sense of pressure obtained through the muscles. We judge of the pressure exerted by an object, or, in other words, its weight, by the amount of muscular exertion required to overcome or lift it. This is what is spoken of as *muscle sense.*

Independently of this sense, however, the skin is able, in a limited degree, to estimate pressure. The forearm and abdomen are said to be the parts endowed with the most accurate sense of pressure.

On the value of sensation it is needless to comment. The ordinary act of standing, for instance, is maintained by the aid of the tactile sense of feeling the ground, and walking would be a very awkward performance if we had to ascertain at each step that our feet were in contact with ground, by the aid of our eyesight instead of the tactile sense. As a matter of fact, in certain forms of paralysis, the patient can only stand with his eyes open, and by the aid of his eyesight he manages to shuffle along with an awkward gait ; but the moment he closes his eyes, he reels and falls to the ground, being unable to preserve his balance.

CHAPTER XXXVI.

THE HAIR AND NAILS.

THERE are yet two structures which remain to be considered. These are the hair and nails, which may be termed appendages of the skin, and are in fact modified forms of the epidermis. It is not easy to ascribe any definite use to the hair or nails, which are evidently rudimentary structures, finding their full development and proper function in the corresponding structures, the fur and claws of inferior animals. Anatomists are familiar with so-called "rudimentary structures." A typical example of it is seen in the *coccyx*, a small bone at the extreme end of the human spine, which is unequivocally a tail, and apparently all that is left to the human race of that graceful appendage. The theory of natural selection and the too flattering genealogy of the human species which it involves, would appear to receive some strength and confirmation from this obsolete caudal remnant. Without, however, going so far as to acquiesce in the theory of our lineal descent from monkeys, it is reasonable to infer, that rudimentary structures simply

serve to preserve the uniformity and completeness of a particular class of the animal kingdom, certain organs being developed and perfected by use, while others dwindle by disuse into insignificance. The *coccyx* and its prototype, the tail, may therefore be considered the general badge of the vertebrate class.

We cannot dispose of the functions of the hair by referring it to the class of ornaments or decorations. Nature never creates anything primarily or solely for ornament. There are many beautiful things in Nature, but their beauty is invariably secondary to the useful purposes which they serve. The first thing they do is, to fulfil the main mission of their existence, and they are only ornamental in so far as beauty is compatible with usefulness. The flowers of the field, with their delicate tints and exquisite perfume, do not spring up simply to be admired, though to gladden the heart of weary-world pilgrims is not the least of their missions. The beautiful shells, superb in their elegant forms and graceful colouring, which litter the golden strand of sunny climes, were not created to entertain the eye or please the fancy of the savage who roams along those shores, but as a protection and dwelling for the delicate beings that inhabit them. The majestic form of the lion, and the sleek gracefulness of the greyhound, though each of them is a dis-

tinct type of beauty, are nevertheless the simple fulfilment of strength on the one hand, and fleetness on the other, for a definite useful purpose. Nature is provident of her resources, and ornament divorced from usefulness finds no favour in her eyes. Her greatest and truest types of beauty are those which result from perfect adaptation of means to an end. Similarly, our cultured tastes lead us to value the beauty of the face in which character and intellect finds expression above the one whose beauty is composed of mere soft outlines and pretty colouring, because the former bears out the true conditions of beauty.

We cannot, therefore, account for the hair by classing it among the decorations which adorn our person, for there is no such class, and Nature is obviously opposed to the principle of adopting any. The hair of the eyebrows, which, above all, might be considered a decoration, is simply intended as a supplement to the eyelashes, for protecting those precious, delicate organs, the eyes, from the invasion of dust and other foreign matter, the smallest particle of which, as we know, is capable of irritating and injuring their functions. We have no right, therefore, to attribute any such purpose to the hair, and we must accept the body hair at least as a rudimentary structure, whose true function is illustrated in the inferior animals. The hair

of the head no doubt tends to protect an important part of the economy from cold, and in scalp wounds, which are apt to bleed freely, on account of the large number of blood vessels in this locality, the hair, becoming matted with blood, contributes largely to its coagulation, and the stopping of the hæmorrhage. It probably also helps to break the force of blows on the bones of the skull, by its soft and resilient property.

When a hair is examined under the microscope, it loses its smooth glossy character, and presents an imbricated or overlapping appearance, similar to the tiles of a house or the scales of a fish. If the hair be split and seen in section, the scaly arrangement is found to exist on the outside only, and to form the bark or rind of the hair, leaving a channel inside packed with a kind of marrow or fat, which feeds the hair, and pigment granules, which impart the characteristic colour to it. The depression in the skin, in which the hair is planted, penetrates the entire thickness of the skin into the subjacent fat. This cavity is lined by the same epidermis as covers the skin, and is called the hair follicle. At the root of the hair, both the hair and follicle become so closely incorporated that when a hair is pulled out, part of the follicle comes away with it, which may be seen with the naked eye as a white gelatinous

matter clinging to the root of the hair. The hair does not grow from its extremity like the branch of a tree, but from the root, from which fresh cells are daily added, pushing out the hair and adding to its length. The fat glands open into the hair follicles, and their function is to supply the unctuous matter which imparts softness and gloss to the hair. The fat glands resemble a bunch of grapes, the stem of which is represented by the duct opening into the follicile. These little glands, stationed at their posts, have the elective power of extracting from the blood the exact ingredients for elaborating the sebaceous matter, and as long as the system is in a healthy condition, they never fail to perform their subtle work, pouring their secretion from the grape-like glands into the duct, which conveys it to the hair. We have little knowledge, while we live and move, of the wonderful operations that are constantly going on in our bodies, nay, of the busy scene of work, which our skin alone affords for contemplation, of the myriads of organs, of the intricate nature of their duties, of the regularity and order which prevail, and the importance and immensity of their aggregate labours. The sebaceous glands acquire greater importance in the lower animals, on account of the larger quantity of hair or fur which they supply. The failure of these glands to meet the requirements of the hair is a sure

sign of impaired health, especially in the lower animals. A sleek, glossy coat in a horse, dog, or cat is an infallible sign of health, and indicates that the animal is in a thriving condition, and the first signs of disease and disorder are manifested in the "staring" coat, so familiar to the lover of domestic animals. What has been said of hair and fur applies equally to feathers, the plumage of birds being equally an indicator of the condition of their health. Who has not observed the bedraggled condition of feathers in the invalid of the poultry yard, as he wanders about dejectedly, apart from his fellows, and the proud mien of the bird in perfect plumage, glorying in health and fine feathers. To a certain extent the hair of the head is similarly an indicator of the state of health, taking on a gloss and smoothness when we are in the enjoyment of health, and becoming dry, stary, and obstinate to the brush when all is not well with the individual. In perfect health, there should be no necessity for the use of applications to the hair. Perfect cleanliness to keep the hair follicles clear, and the use of the hair brush for stimulating the sebaceous glands, are all that is necessary. Washing the hair frequently appears to excite the secretion of the glands, so that instead of depriving the hair of its natural lubricator, frequent ablutions are often the very thing to

cure dryness of the hair, unless it be due to constitutional causes. During severe illnesses, owing to the depression of the vital powers, the hair frequently suffers from deficient nutrition, and falls off as convalescence is being established, and the place of the lost hair is filled by a fresh and more vigorous growth. Perverted nutrition also causes greyness through a deficient secretion of pigment, and this may be caused by the natural decay of old age, or by the effect of such debilitating influences as rheumatism and neuralgia of the scalp, undue mental anxiety, care, grief, etc. Baldness is another freak of Nature, for which it is difficult to find a cause, except the general habit of wearing hats, caps, and other covering for the head, adopted by most races of men, and which some authorities are disposed to think has the effect of causing atrophy and relaxation of the hair tubes. There seems to be some measure of truth in this theory, as a ship's engineer once informed me that, in common with himself, most men of his profession, and the officers, who wore their caps all day, were more or less bald. On the other hand, however, there are frequent cases of baldness among certain Indian races, who never wear any head covering whatever. In many cases it appears to be simply a hereditary failing.

The number and size of the fat or sebaceous

glands do not bear any proportion to the quantity or luxuriance of the hair, being abundant and well developed in many parts, such as the tip of the nose, where there are no hairs to be seen. When from any cause the follicles become obstructed, the sebaceous secretion accumulates and gives rise to inflammation, producing what are known as pimples, from which the impacted sebaceous matter may be expelled by pressure. There are no sebaceous glands in the palms and soles, which accounts for the sodden, bleached appearance of these parts, when they undergo prolonged immersion in water, as in the case of washer-women. The sebaceous glands have obviously been omitted from these parts so as not to interfere with prehension and walking.

The Nails.—The nails are another modification of the epidermis, and, like it, are entirely devoid of nerves and blood vessels. The bed of the nail, however, the part on which it rests and from which it draws its sustenance and growth, is highly sensitive and richly endowed with blood. Hence blows on the nail are extremely painful, whilst the nail itself may be cut or otherwise injured without the slightest sensation. The nails are delicate organs of touch through their intimate relation with the underlying nerves, and recognize asperities which escape the feeling of the pulp of the fingers.

CHAPTER XXXVII.

CLASSIFICATION AND TREATMENT OF SKIN DISEASES.

OWING probably to the great number and variety of its functions, the skin is subject to numerous disorders, which are divided into groups or orders, based on certain similarities in the character of eruptions. Thus, all the varieties of skin disease which owe their origin to parasites, are referred to one group, those characterised by vesicles or blisters to another, &c. This is the method of classification adopted in skin diseases, which to a great extent simplifies the task of recognising or *diagnosing* as it is called, particular affections from the almost indefinite varieties which exist. It would serve no useful purpose to enumerate the orders of skin disease, with a minute description of each. I may however sketch a few of the more ordinary varieties, which cannot fail to be interesting on account of their general prevalence, and briefly suggest the methods and modes of treatment.

Ringworn is caused by a vegetable parasite

and affects only children as a rule. It consists of circular patches of scaly eruption, generally on the scalp, varying in size from a sixpence to a five-shilling piece or larger. The hairs on the diseased surface are dry, brittle and broken off close to the scalp. It is highly contagious, and frequently occurs as an epidemic in schools. It may occur on the general surface as well as the scalp, and may frequently be seen in both situations in the same subject.

The ordinary treatment consists in shaving the head, repeatedly washing with carbolic soap, and the application of some lotion or ointment to kill the fungus. Iodine, carbolic acid, sulphurous acid, tar, and preparations of mercury in varying strengths may be used for this purpose. If the disease be recent, this treatment will probably succeed. Occasionally however it becomes chronic, and demands the utmost patience, care, and skill from the physician. Day by day the diseased hairs may have to be examined, and one by one pulled out before the complaint is eradicated. The parasites lodge in the diseased hair stumps, every one of which must be removed before they can be exterminated.

There is another parasite which attacks the scalp, causing the hair to fall off one or more circular or oval spots of different sizes, leaving perfectly smooth bald patches. The treatment

consists in repeatedly blistering the diseased patches, and when it is evident by the growth of new hairs, that the fungus has been destroyed, stimulating the part with Spanish fly or ammonia hair wash.

For ringworm on the general surface of the skin, nothing is better than the application of weak tar ointment, which speedily clears away the disease.

A variety of ringworm, called *liver spot*, makes its appearance on the front of the chest or abdomen, consisting of circular yellowish patches covered with branny scales. It is caused by a cryptogamic plant, and is successfully treated by the application of sulphurous acid lotion, great attention being paid at the same time to cleanliness.

There is a disease, popularly known as *dry tetter* or *European leprosy*, which is not unlike ringworm in appearance, but must be carefully distinguished from it. The former is not contagious, is not caused by a parasite, occurs principally in the neighbourhood of joints, particularly the knee and elbow, and is generally a most obstinate and troublesome disease to treat.

Scabies or Itch is a contagious disease, characterised by great irritation of the skin. It is due to an animal parasite, the male of which wanders about the surface, while the

female burrows beneath the epidermis, forming tunnels in which she deposits her eggs. The disease first attacks the flexures of the fingers and the wrists, and afterwards spreads to the abdomen and thighs. The treatment consists in warm baths and the free application of sulphur ointment.

Eczema is a catarrhal disease of the skin, and derives great importance from its association very frequently with gout, dyspepsia, and kidney disease. It assumes various phases. At one time it appears as a cluster of vesicles discharging a serous fluid, which stiffens linen and dries into thin yellow crusts. At another, it presents a hot, inflamed, irritable surface, while at another, again, it forms thick crusts of dried up matter. The last may especially be observed in ill-nourished children, in the region of the ear and cheek. All these forms are accompanied by more or less impairment of the general health, and require internal treatment as well as local applications, while the diet should be carefully regulated.

Roseola is an interesting affection, on account of its frequent resemblance to scarlatina and measles. It is accompanied by fever, sore throat and stomach derangement. The eruption consists of transient patches of redness, or of numerous minute rose-coloured spots scattered over the surface. A slight laxative followed by

tonics, and sponging the skin with vinegar and water, are all that is necessary in the way of treatment.

Nettlerash.—This eruption is too well known to need description. It may be caused by contact with the stinging nettle, by the bites of insects, and by stomach derangements. It is said that certain articles of diet, such as cucumbers, mushrooms, shell-fish, nuts, tinned meat, &c., favour its production. It is also said to be due to uterine disorder, to gout, rheumatism, and feeble conditions of the nervous system. The treatment will depend on the exciting cause, while the local affection may be soothed by a sedative lotion, containing lead, laurel water, glycerine, &c.

Acne or Pimples is an inflammation of the sebaceous glands. It commonly makes its appearance at the age of puberty, partly owing to the debility consequent on this period, but chiefly, perhaps, from the physiological activity of the hair follicles at this age. In some cases it may be due to a naturally sluggish thick skin, in others to constipation, dyspepsia, and menstrual irregularities. In treating pimples, regard must be had to peculiar constitutional conditions, and the internal treatment regulated accordingly, while the following may be used as a local application :—

Take of

Milk of Sulphur,
Glycerine,
Spirits of Wine,
Carbonate of Potash,
Sulphuric Æther,

equal parts, and make into a paste. To be rubbed at night into the affected parts, until a slight redness is produced.

There is an impression prevalent among many people, that chronic eruptions should not be cured too rapidly, for fear of driving them to some internal organ, and this is frequently made a cloak for incapacity to deal successfully with such cases. Children are thus often left to suffer indefinitely from hideous eruptions, and I have known cases of chronic ulcer of the leg, left for years, without any attempt to cure them. This is an old-fashioned error, which is fast disappearing with the light of modern knowledge and experience, which has sufficiently demonstrated that there is little or no danger in promptly dealing with old standing eruptions.

Diet in Skin Disease.—Where skin diseases occur among the poor, and the ill-nourished, it is generally necessary to order a liberal diet, to counteract the debilitating influences by which they are usually surrounded; while among the

better classes, the opposite condition of plethora mostly prevails, exciting and maintaining morbid action. In the latter, therefore, the indication is obviously to lessen the diet, and feed the patient on plain articles of food.

The regulation of the diet must be conducted with reference to other morbid conditions, accompanying and having a direct connection with the skin affection. Thus gout, dyspepsia, and kidney disease may accompany and play an important part in causing eczema, and the diet must be regulated with due consideration to those affections.

Children suffering from ringworm should be encouraged to take the fat of meat, as well as milk, cream, and eggs.

Stimulants are contra-indicated in the early stages of skin disease, when it is accompanied by fever and inflammation, and must be altogether avoided in syphilitic eruptions of any kind. In all chronic cases attended with debility and impaired nervous power, the patient should be ordered a full unstimulating diet.

In conclusion, the functions of the excreting organs must be carefully attended to in treating skin disease, and torpidity of the liver, menstrual irregularity or deficient action of the kidneys must be rectified, and the system brought to a

healthy condition, before the healing process can be expected to begin satisfactorily. All kinds of corruption will breed in the stagnant pool, and the blood must be maintained like a running stream, cool, fresh and pure.

THE END.

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